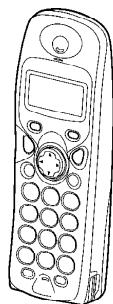


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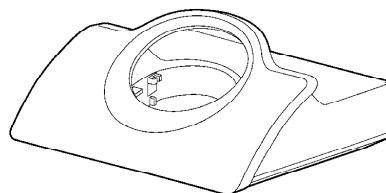
Telephone Equipment

Caller ID Compatible

KX-TCD410ES
Digital Cordless Phone
Silver Version
(for United Kingdom)



(HANDSET)



(BASE UNIT)

SPECIFICATIONS

SPECIFICATION

Standard:	DECT= (Digital Enhanced Cordless Telecommunications)	Battery life, Handset (if batteries are fully charged):	Stand-by: Up to 120 hours (Ni-MH) Talk: Up to 10 hours (Ni-MH)
Number of channels:	120 Duplex Channels	Operating conditions:	5 - 40 °C, 20 - 80 % relative air humidity (dry)
Frequency range:	1.88 GHz to 1.9 GHz	Dimensions, Base Unit (D x W x L):	58 mm x 128 mm x 105 mm
Duplex procedure:	TDMA (Time Division Multiple Access)	Dimensions, Handset (D x W x L):	143 mm x 48 mm x 32 mm
Channel spacing:	1728 kHz	Weight, Base Unit:	about 170 g
Bit rate spacing:	1152 kbit/s	Weight, Handset:	about 120 g
Modulation:	GFSK	Connection jack:	RJ11 to BT Plug
RF Transmission Power:	about 250 mW	AC adaptor plug:	3 Pin UK
Voice coding:	ADPCM 32 bit/s		
Operation range:	Up to 300 m outdoors, Up to 50 m Indoors		
Analog telephone connection:	Telephone Line/PBX		
Power source:	AC Adaptor 220 - 240 V, 50/60 Hz		
Power consumption, Base Unit:	5 VA		

Design and specification are subject to change without notice.

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WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.

Panasonic

1. ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver (Ag), and Copper (Cu).

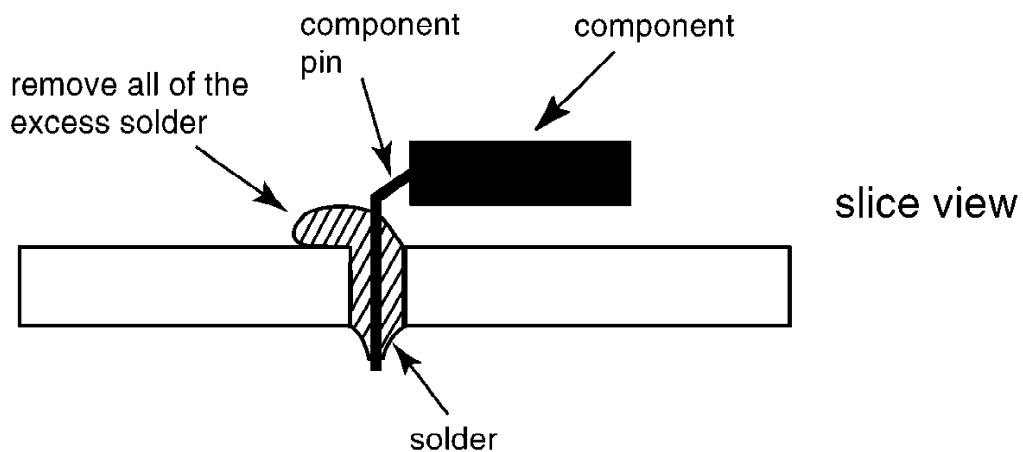
This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

- PbF solder has a melting point that is 50°F ~70°F (30°C ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700°F ± 20°F (370°C ± 10°C). In

case of using high temperature soldering iron, please be careful not to heat too long.

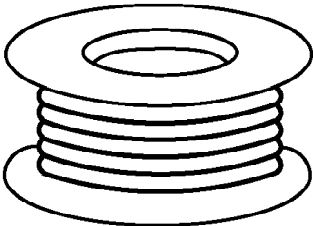
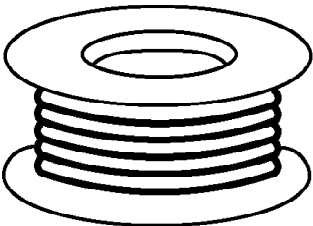
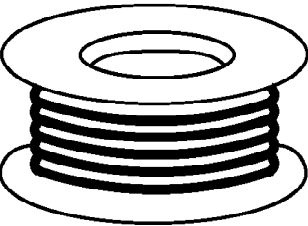
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F (600°C).
- If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See the figure below).



1.1. Suggested PbF Solder

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper (Sn+Ag+Cu), you can also use Tin and Copper (Sn+Cu) or Tin, Zinc, and Bismuth (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials.

The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

1.2. How to recognize that Pb Free solder is used (at KX-TCD410ES)

1.2.1. Base Unit PCB

(Component View)

(Flow Solder Side View)

1.2.2. Handset PCB

(Component View)

(Flow Solder Side View)

2. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not touch IC or LSI pins with bare fingers.


3. CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

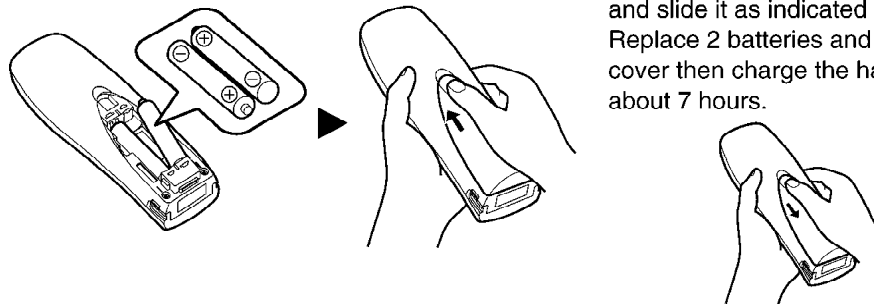
Dispose of used batteries according to the manufacture's Instructions.

4. BATTERY

4.1. Battery Instration

Please ensure the batteries are inserted as shown.  part should be inserted first.
Close the cover as indicated by the arrow.

- When you replace the batteries,  part should be removed first.

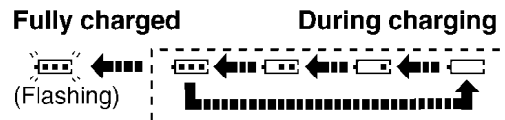
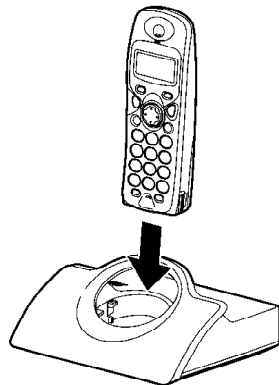






To replace the battery:
Press the notch on the cover firmly and slide it as indicated by the arrow. Replace 2 batteries and close the cover then charge the handset for about 7 hours.

4.2. Battery Charge

At the time of shipment, the batteries are not charged. To charge, place the handset on the base unit.

Please charge the batteries for about 7 hours before initial use. During charging, the battery icon is as shown below.



Display icon	Battery strength
	High
	Medium
	Low
	Needs to be charged

The handset which power is off will be turned on automatically when it is placed on the base unit.


In normal use, the handset and the base unit should be powered on at all times.

Note for Service:

The battery strength may not be indicated correctly if the battery is disconnected and connected again, even after it is fully charged.

In that case, by recharging the battery as mentioned above, you will get a correct indication of the battery strength.

4.3. Battery Life

- Battery life is dependent on use and conditions but in general when using fully charged Ni-MH batteries (700 mAh):
Talk time: 10hrs approx.
Standby time: 120hrs approx.
- When using Ni-Cd batteries (250 mAh):
Talk time: 4hrs approx.
Standby time: 40hrs approx.
(Times indicated are for peak performance)
- The batteries reach peak performance after several full charge/discharge cycles.
- The batteries cannot be overcharged unless they are repeatedly removed and replaced.
- If battery life is shortened then please check that battery and charge terminals are clean.
- For maximum battery life, it is recommended that the handset is not recharged until battery icon flashes 

4.4. Replacing the Batteries






If the  icon flashes after a few telephone calls even when the handset batteries have been fully charged, 2 batteries must be replaced.

Charge new batteries for approximately 7 hours before initial use.

(The telephone line cord must not be connected to the telephone socket at this time).

When replacing the batteries, ensure that the correct battery type is selected.

Selecting the Battery Type

1  Press MENU.	2  Search/Select "SETTING HS".	3  Search/Select "OTHER OPT".	4  Search/Select "BATTERY TYPE".
5  Search/Select "NI-CD" or "NI-MH".			

- To exit the operation, press  any time.

- When Ni-Cd batteries are fitted with the

"BATTERY TYPE" setting in "NI-MH",

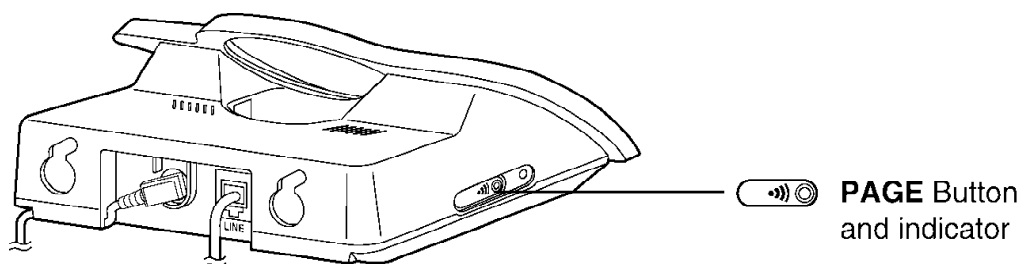
 icon will disappear and stop charging even if the handset is on the cradle.

- Do not use no-rechargeable batteries. If no-rechargeable batteries are fitted and start charging, it may cause the leakage of the battery electrolyte.

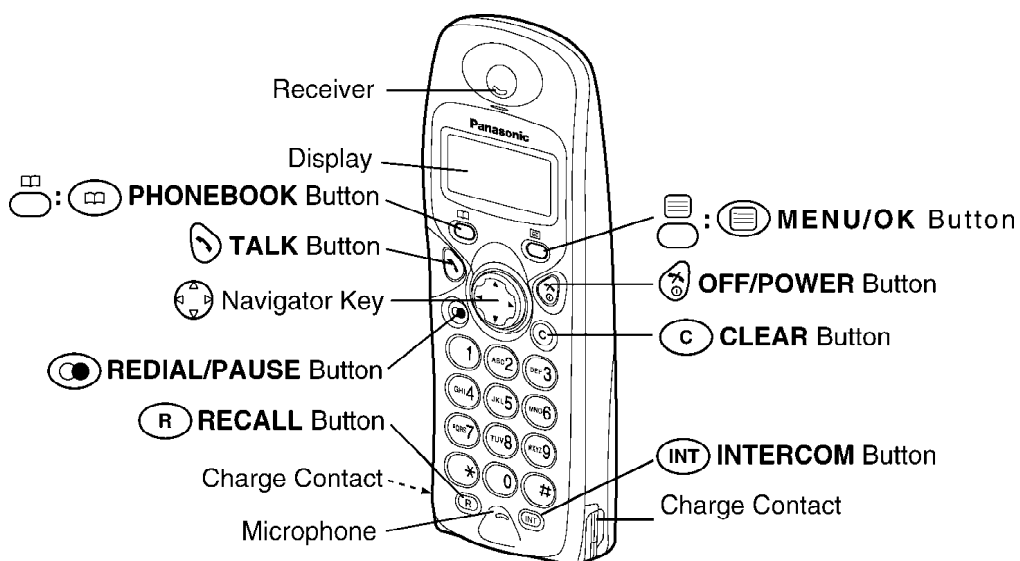
Please use only Panasonic P03P(Ni-MH) or P03H(Ni-Cd) batteries.

5. LOCATION OF CONTROLS

5.1. Base Unit



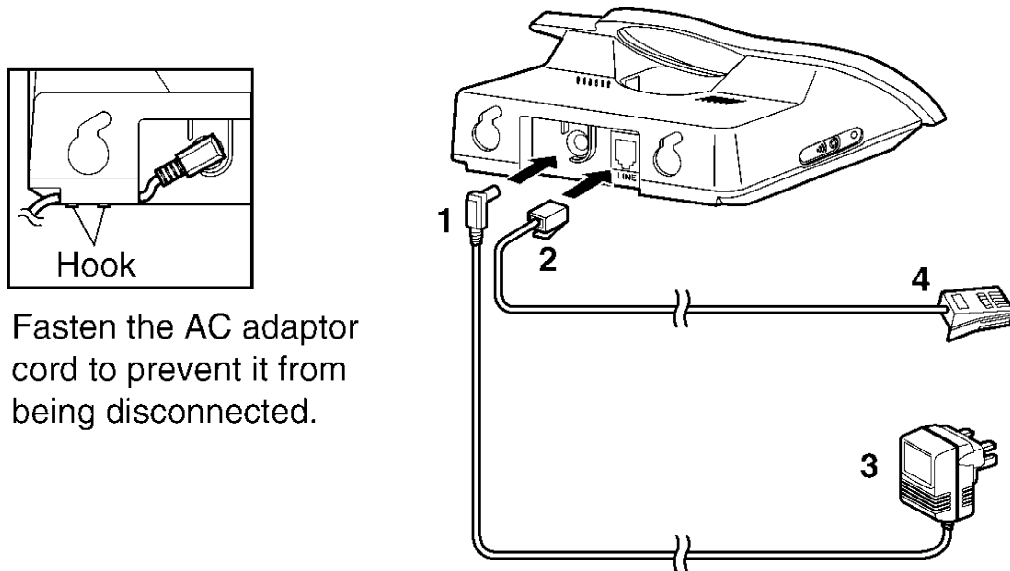
5.2. Handset



6. SETTINGS

6.1. Connection

Do not connect the telephone line cord to the phone socket 4 until the handset is fully charged. Plug in the AC adaptor and the telephone line cord in order 1, 2, 3. (Switch on AC mains outlet.)



The AC adaptor must remain connected at all times (It is normal for the adaptor to feel warm during use).

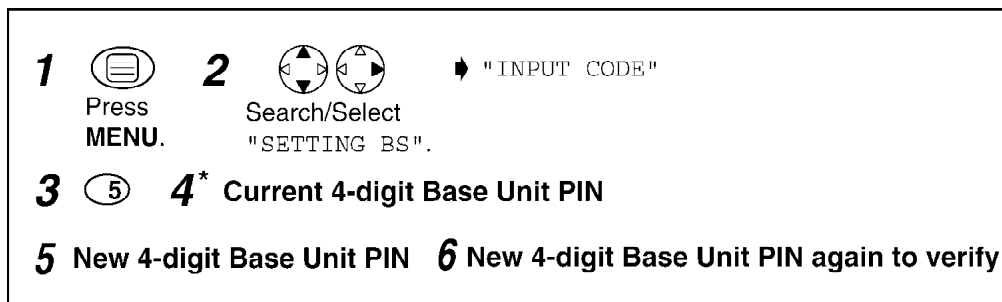
- Never install telephone wiring during a lightning storm.

6.2. Symbols Used in This Operating Instructions

Symbol	Meaning
	To search the desired item, press UP or DOWN .
	To select the desired item, press RIGHT .
	To search and then to select the desired item, press UP or DOWN then RIGHT .
	To move the cursor to the right or to the left, press RIGHT or LEFT .
	To go to the next step.
" "	The words in " " indicate the words in display.

6.3. PIN Code

6.3.1. Base Unit



Changing Base Unit PIN

The factory preset is 0000. Once you have programmed the handset PIN, you cannot confirm it. We recommend you write down the handset PIN. If you forget it, please consult our Panasonic Customer Care Helpline. U.K. 08700 100 076 R.O.I. 01289 8333

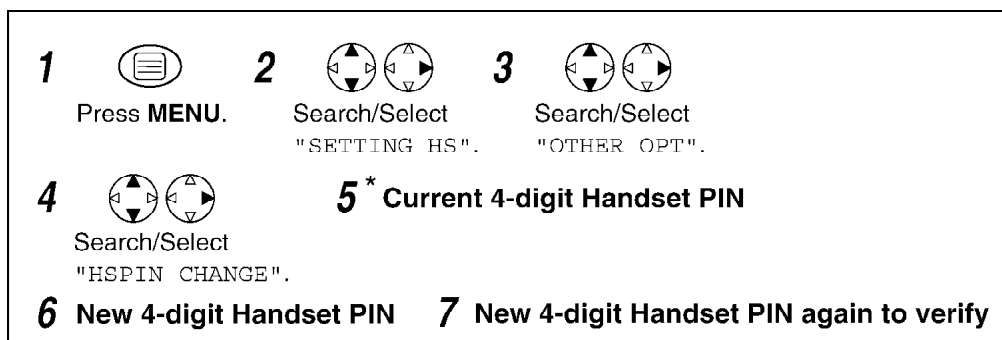
- To exit the operation, press  any time.

For Service Hint:



* : If the current 4-digit PIN is forgotten, press  and you will be able to enter new PIN.

6.3.2. Handset



Changing Handset PIN

The factory preset is 0000. Once you have programmed the handset PIN, you cannot confirm it. We recommend you write down the handset PIN. If you forget it, please consult our Panasonic Customer Care Helpline. U.K. 08700 100 076 R.O.I. 01289 8333

- To exit the operation, press  any time.





For Service Hint:

* : If the current 4-digit PIN is forgotten, press      and you will be able to enter new PIN.

6.4. Reset

6.4.1. Base Unit

If the base unit is reset, the Caller ID list will clear.

1		2		3	
	Press MENU.		Search/Select "SETTING BS".		"INPUT CODE"
4	4-digit Base Unit PIN		5		
				Press OK.	








- To exit the operation, press  any time.

Base Unit Initial Settings

Function	Initial Setting
Ringer Mode	All Handsets
Number of Rings	3
Earth/Time Break Recall	Time Break Recall
Pause Timing	3 seconds
Call Restricted Handsets	All Clear
Call Restriction Numbers	All Clear
4-Digit Base Unit PIN	0000

6.4.2. Handset

You can reset all of the handset settings to their initial settings.

1		2	 	3	 	4	4-digit Handset PIN
	Press MENU .		Search/Select "SETTING HS".		Search/Select "RESET HS".		
5	 						
	Search/Select "YES" or "NO".						

- To exit the operation, press  any time.

Handset Initial Settings

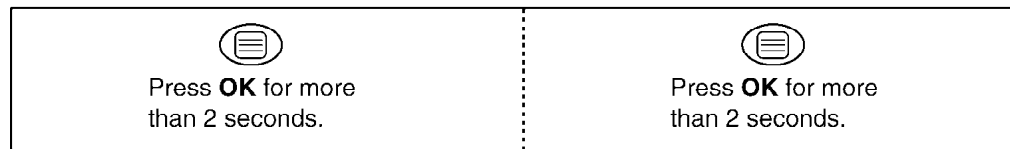
Function	Initial Setting
Time Alarm Mode	OFF
Alarm Time	Clear
Handset Ringer Volume	6
Handset External Ringer Pattern	1
Handset Internal Ringer Pattern	1
Handset Paging Tone Pattern	1
Handset Alarm Tone Pattern	1
Key Tone	ON
Call Waiting Tone	ON
Range Warning Alarm	OFF
Battery Low Alarm	ON
Standby Mode Display	Clock
Talk Mode Display	Length of the Call
Display Language	English
Call Prohibition Mode	OFF
Direct Call Mode	OFF
Direct Call Number	Clear
4-Digit Handset PIN	0000
Auto Talk	OFF
Base Unit Access	Automatic Base Unit Access
Redial Memory	All Clear
Handset Receiver Volume	Medium


6.5. Key Lock

You can lock the handset dialling buttons. Only incoming calls are accepted while the key lock is on. The key lock is cancelled if the handset is turned off.

When the key lock is on, emergency calls cannot be made until key lock is cancelled.

Key Lock On



-  is displayed and all dialling buttons are locked.

6.6. Recall Feature

RECALL is used to access special telephone services. Contact your Network provider for details. If your unit is connected to a PBX, pressing RECALL allows you to access some features of your host PBX such as transferring an extension call.

6.7. Dialling Pause for PBX line/long distance service users

A dialling pause is used when a pause in the dialling of the phone number is necessary using a PBX or accessing a long distance service.

For example, when 9 (line access number) is dialled followed by a pause to access an outside line through a PBX:



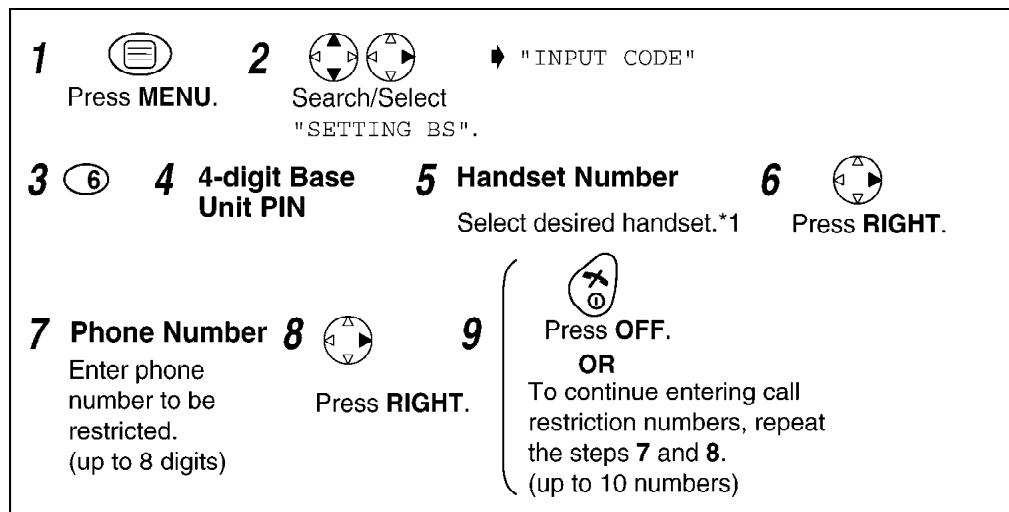
- Entering a pause prevents misdialling when you redial or dial a stored number.
- Pressing PAUSE once creates one pause. To extend the pause requirement time, press PAUSE accordingly.

 ^{*1} is displayed on the LCD.

6.8. Call Restriction

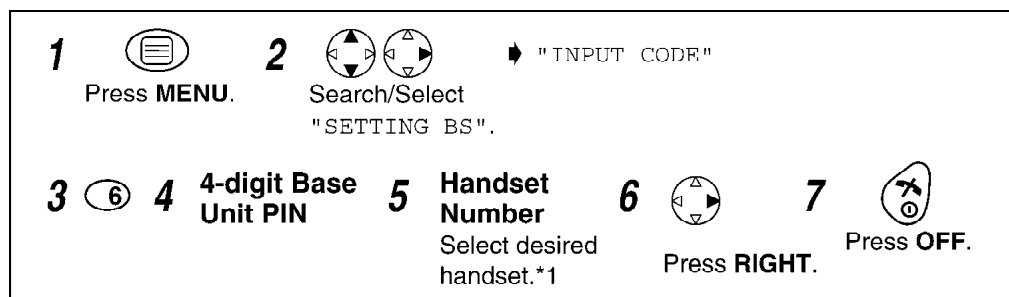
You can restrict selected handset(s) from dialling selected phone numbers. You can assign up to 10 call restriction numbers (up to 8 digits). If you dial a restricted number, the call does not

connect and restricted number flashes.



- To exit the operation, press any time.
- *1: The selected handset number flashes.





6.9. Cancelling Call Restricted Handset(s)




- To exit the operation, press any time.
- *1: The selected handset(s) will stop flashing..

6.10. Call BAR On/Off






This allows you to make emergency and internal call.

1		2		3	
	Press MENU .		Search/Select "SETTING HS".		Search/Select "CALL OPT".
4		5	4-digit Handset PIN	6	
	Search/Select "CALL BAR".				Search/Select "ON" or "OFF".*1

- To exit the operation, press  any time.

- *1: If "ON" is selected,  is displayed.

6.11. Selecting the Display Language


1		2		3	
	Press MENU .		Search/Select "SETTING HS".		Search/Select "DISPLAY OPT".
4		5			
	Search/Select "LANGUAGE".		Search/Select desired language.		

- To exit the operation, press  any time.

6.12. Summary of Programmable Functions

You can select and execute the following functions by pressing direct command as follows without programming.

These operations need to be done with the Handset near the base unit.

Press . Press  or  until the arrow points to "Setting Base", then press .

"Input Command" is displayed.*1

<Direct command>














Press 1 , 4-digit base unit PIN, then 1	To select the all handsets ringer mode
Press 1 , 4-digit base unit PIN, then 2	To select the selected handset(s) ringer mode
Press 1 , 4-digit base unit PIN, then 3	To select the selected then all handsets ringer mode
Press 2 then 1	To set the base unit key tone ON/OFF
Press 2 then 2	To select the base unit ringer volume
Press 2 then 3	To select the base unit ringer type
Press 3 , 4-digit base unit PIN, then 1	To select the tone/pulse dialing mode
Press 3 , 4-digit base unit PIN, then 2	To select the flash mode
Press 3 , 4-digit base unit PIN, then 3	To select the pause timing
Press 5 then 4-digit base unit PIN ^{*2}	To change the 4-digit base unit PIN ^{*2}
Press 6 then 4-digit base unit PIN	To set the call restriction
Press 7 then 4-digit base unit PIN	To cancel a handset registration in the base unit
Press 0 then 4-digit base unit PIN	To reset the base unit settings
Press * *	To set the time
Press *	To set the date

*1 If any key is not pressed over 60 seconds, the display will return to "Setting Base".

*2 Refer to **PIN Code** () for more details.

7. DISPLAY

7.1. Handset Display

Icon	Displays	Icon	Displays
	Within range of a base unit		Call Bar ON
	Out of range/No registration/ No power on base unit		Direct Call ON
	Paging or using the handset		Key Lock ON
	Marking or answering calls		Ringer Volume OFF
	Phonebook Mode		Dialling Pause
	In setting Mode		
	Battery strength is low		
	Battery strength is high		

7.2. Before Requesting Help (Troubleshooting)

If you experience any problems with the normal use of your apparatus, you should unplug it from the telephone outlet and connect a known working telephone in its place.

If the known working telephone still has problems, then please contact the customer service department of your Network provider.

If it operates correctly, then the problem is likely to be a fault in your apparatus.

In this case, contact your supplier for advice. Your Network provider may charge you if they attend a service call that is not due to apparatus supplied by them.

Turn the power OFF then ON (Handset) / Disconnect then connect the AC adaptor (Base Unit).

Problem	Possible cause	Solution
NO LCD display in handset.	<ul style="list-style-type: none"> Handset not turned on. 	<ul style="list-style-type: none"> Turn on power. →(Refer to Power On/Off.)
Handset will not turn on.	<ul style="list-style-type: none"> Batteries not inserted. Batteries not charged. 	<ul style="list-style-type: none"> Insert the 2 rechargeable batteries supplied . Place handset in base and connect AC adaptor to base and AC outlet (full charge period 7 hrs).
Batteries charge icon not counting up.	<ul style="list-style-type: none"> Dirty charge contact. Base not powered up. 	<ul style="list-style-type: none"> Clean charge / battery contact and retry charge. Connect AC adaptor to base unit and AC outlet.
📶 icon flashes.	<ul style="list-style-type: none"> Handset not registered to base. Handset out of range of base. No power into base unit. 	<ul style="list-style-type: none"> Register handset to base. Move handset closer to base. Connect AC adaptor to base unit and AC outlet.
Handset busy tone heard when 📞 is pressed.	<ul style="list-style-type: none"> Handset out of range of base. Another handset in use. 	<ul style="list-style-type: none"> Move handset closer to base. Wait for the other user to complete call.
No dial tone.	<ul style="list-style-type: none"> Telephone line not connected. 	<ul style="list-style-type: none"> Insert telephone cord to network. Turn power OFF then ON.
Cannot dial out.	<ul style="list-style-type: none"> Call prohibition mode set. Particular dialled number is restricted. Key lock mode ON. 	<ul style="list-style-type: none"> Turn feature off. →(Refer to Call Prohibition On/Off in Call Option.) Remove number from call restricted list. Turn key lock OFF. →(Refer to Key Lock (Handset only).)
Handset will not ring.	<ul style="list-style-type: none"> Ringer switched off. 	<ul style="list-style-type: none"> Set ringer to one of 6 volume levels.
Last number redial does not work.	<ul style="list-style-type: none"> Number exceeded 24 digits. 	<ul style="list-style-type: none"> Redial manually.
No Caller ID number displayed.	<ul style="list-style-type: none"> Service not supplied. Caller has withheld info. 	<ul style="list-style-type: none"> Caller ID service must be arranged with Network provider.
<ul style="list-style-type: none"> 🔋 icon flashes. 🔋 icon is disappeared. 	<ul style="list-style-type: none"> Battery low. Wrong battery type selected. 	<ul style="list-style-type: none"> Recharge batteries. Set the correct battery type.
Cannot register handset to base.	<ul style="list-style-type: none"> Max. number of bases already registered to handset. Max. number of handsets already registered to base unit. Wrong PIN number entered (Default 0000). Electrical noise in local area. 	<ul style="list-style-type: none"> Delete unused base registrations from handset. Delete unused handset registrations from base. If PIN number is lost, contact the Panasonic Customer Care Helpline. →(Refer to Call Restriction in Call Option.) Move base/handset away from sources of electrical noise (e.g TV, radio).

Cross Reference:

Power On/Off ()

Call Restriction ()

Key Lock ()

8. OPERATIONS

8.1. Power On/Off

Power on



Press for more than
1 second. *1

Power off



Press for more than
2 second. *2



*1 When button is released, the display changes to the standby mode.

*2 The display goes blank.

8.2. Making a Call

Pre-dialling

1 Phone Number *1

2



Press TALK.

Post-dialling



Press TALK.

2 Phone Number

*1 If you need correction, press CLEAR. Digit is cleared to the left, then enter numbers.

8.3. Answering Calls

Terminating a Call



Press TALK. *1

(During a call) ➔



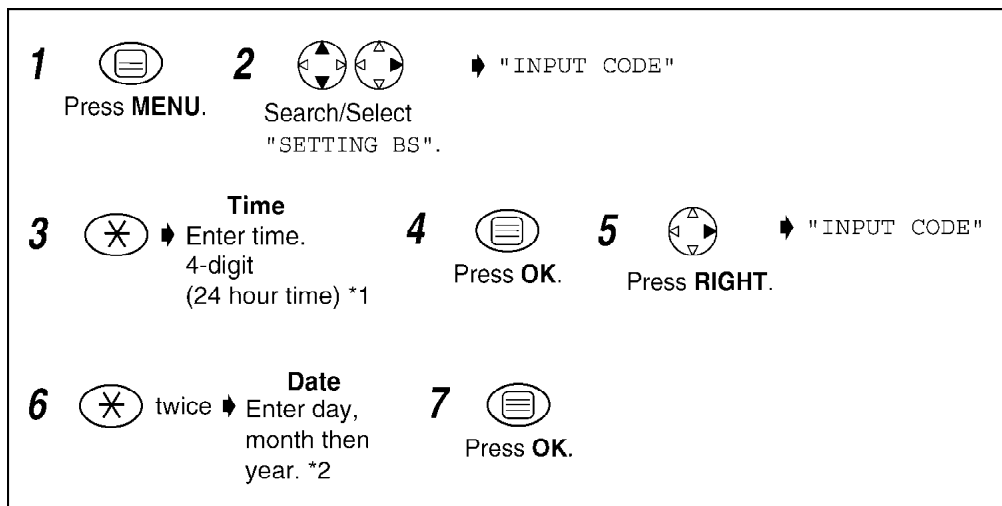
Press POWER.


- Each ringer will start ringing with lower volume then gradually increase the volume when receiving a call.

*1 You can also answer a call by pressing any dialling button, INTERCOM, #, or ✕.

8.4. Setting the Clock/Date

After a mains power failure the clock needs to be reset. Ensure that  icon is not flashing.



- To exit the operation, press  any time.

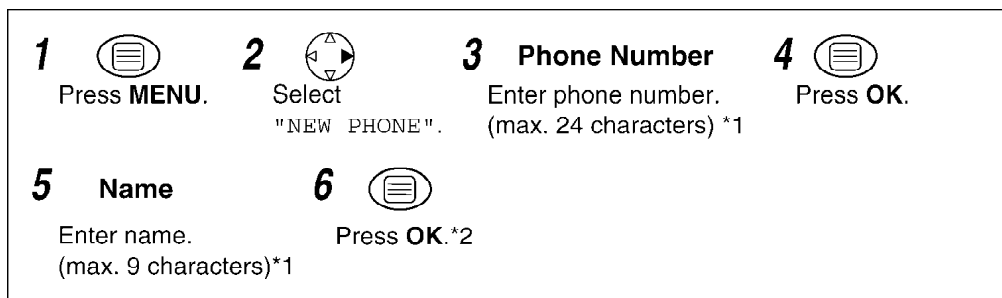
*1 For example, to set 7:15, enter 0715.


*2 For example, to set the 16th of February, 2003, enter 160203.

8.5. Phonebook

You can store up to 20 caller information in the phonebook. If you received a call from the same phone number you stored with a name in the phonebook, the display will show the caller's name.

8.5.1. Storing a Caller Information



- To exit the operation, press  any time.

*1 If you need correction, press RIGHT or LEFT to move cursor then clear character by pressing CLEAR, and/or enter characters. Characters are cleared or added to the left of the flashing character. To enter characters, see Character Selection below.

*2 To continue storing another caller information, repeat the steps from 3.

Character Selection

Keys	Number of times key is pressed								Keys	Number of times key is pressed				
	1	2	3	4	5	6	7	8		1	2	3	4	5
①	#	[]	*	,	-	/	1	⑥	M	N	O	6	
②	A	B	C	2					⑦	P	Q	R	S	7
③	D	E	F	3					⑧	T	U	V	8	
④	G	H	I	4					⑨	W	X	Y	Z	9
⑤	J	K	L	5					⑩	Blank	0			

Character Table

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Z	1	2	3	4	5	6	7	8	9	*	0	#	-	/	[]	,							
Z	1	2	3	4	5	6	7	8	9	*	0	#	-	/	[]	,							

Editing a Caller Information

1 Press **PHONEBOOK**.^{*1}

2 Search/Select desired item.

3 Select "EDIT".

4 The 1st digit of the desired phone number blinks.

<Phone Number>

5 Move cursor.

6 Press **CLEAR**.^{*2}

AND/OR

Number

7 Press **OK**.

Edit the phone number.^{*3}

<Name>

8 Move cursor.

9 Press **CLEAR**.^{*2}

AND/OR

Name

10 Press **OK**.

Edit the name.^{*4}

Clearing a Caller Information

1 Press **PHONEBOOK**.^{*1}

Search/Select desired item.

Search/Select "CLEAR".

4 Search/Select "YES".^{*5}

Dialling with the Phonebook

1 Press **PHONEBOOK**.^{*1}

2 Search desired item.

3 Press **TALK**.

- To exit the operation, press  any time.

*1 If there is no item stored in the phonebook, the display shows

"NO ITEM"

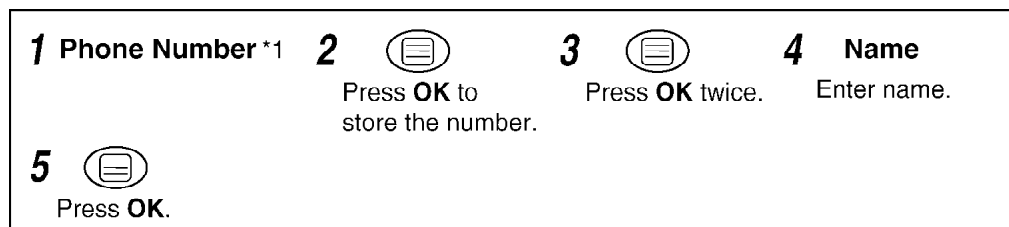
*2 Digits are cleared to the left of the flashing digit.

*3 Digits are added to the left of the flashing digit. If you need to clear or add more than one digit, repeat the steps from 5.

*4 Digits are added to the left of the flashing digit. If you need to clear or add more than one digit, repeat the steps from 8.

*5 To continue clearing another caller information, repeat the steps from 2.

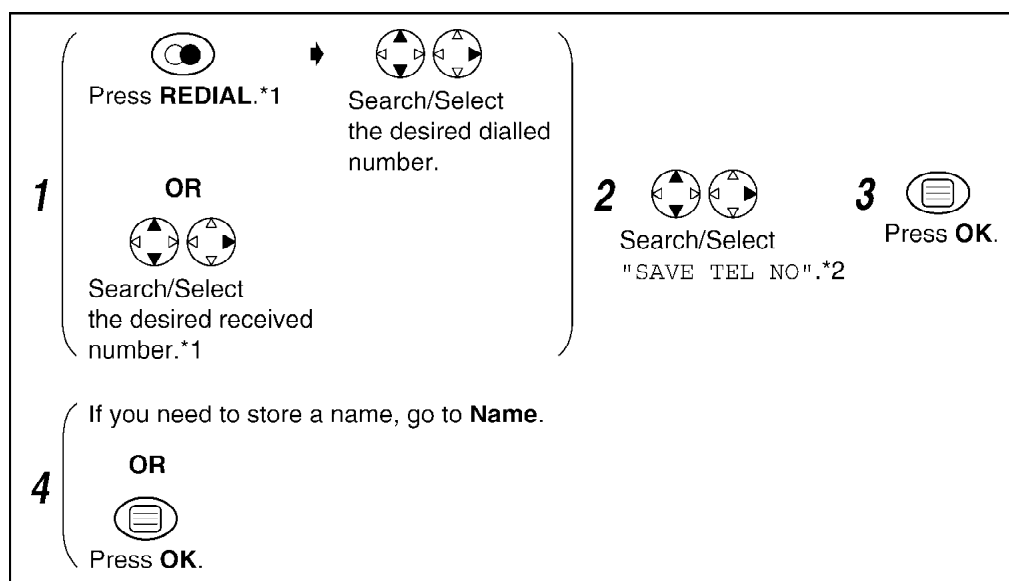
8.5.2. Storing the Phone Number into the Phonebook When Pre-dialling




- To exit the operation, press  any time.

*1 If you need correction, press CLEAR. Digit is cleared to the left, then enter numbers.

8.5.3. Storing the Number in the Redial/Caler List into the Phonebook



- To exit the operation, press  any time.

*1 If there is no item stored in the redial/caller list, the display shows






"NO ITEM"

*2 If you need correction, press RIGHT or LEFT to move cursor then clear character by pressing CLEAR, and/or enter characters. Characters are cleared or added to the left of the flashing character.


8.5.4. Hot Key (: Speed Dial)

You can assign the dialling buttons 1 through 9 as hot keys. You can choose 9 phone numbers from the phonebook.

Registering a Phone Number as a Hot Key

1  Press PHONEBOOK.*1	2  Search/Select desired item.	3  Search/Select "HOT KEY REG".	4  Search/Select desired dialling button.*2
5  Search/Select "YES".			

Dialling with Hot Key

1 Press and hold the dialling button registered as a hot key.	2  Press TALK .
--	---

Clearing the Hot Key Registration

1 Press and hold the dialling button registered as a hot key.	2  Press RIGHT .	3  Select "CLEAR".	4  Search/Select "YES".*3
--	--	---	---

- To exit the operation, press  any time.

*1 If there is no item stored in the phonebook, the display shows

"NO ITEM"

*2 The number is flashing if the dialling button is already assigned as a hot key.

*3 Phonebook registration will be remained even hot key registration is cleared.

9. DISASSEMBLY INSTRUCTIONS

9.1. Base Unit

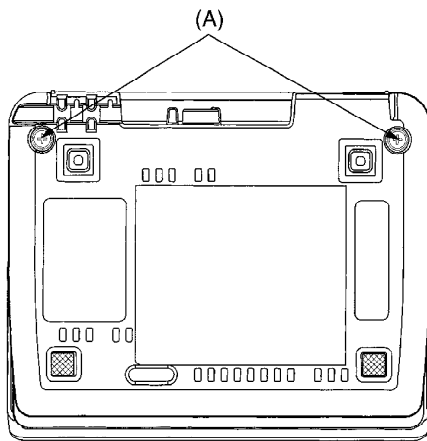


Fig. 1

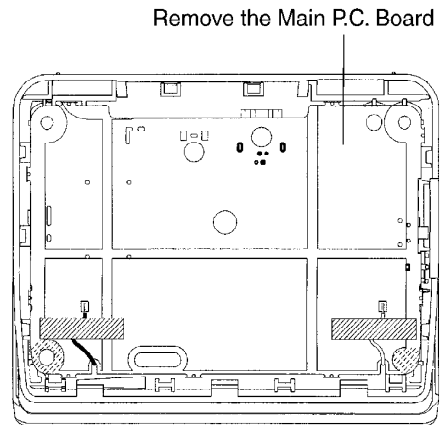


Fig. 2

Shown in Fig.-	To Remove	Remove
1	Lower Cabinet	Screws (2.6 × 12).....(A) × 2
2	Main P.C. Board	Main P.C. Board

9.2. Handset

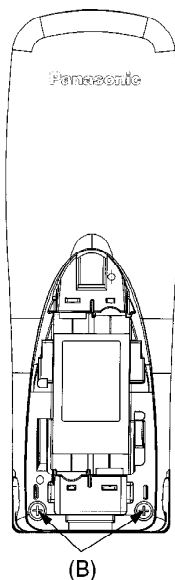


Fig. 3

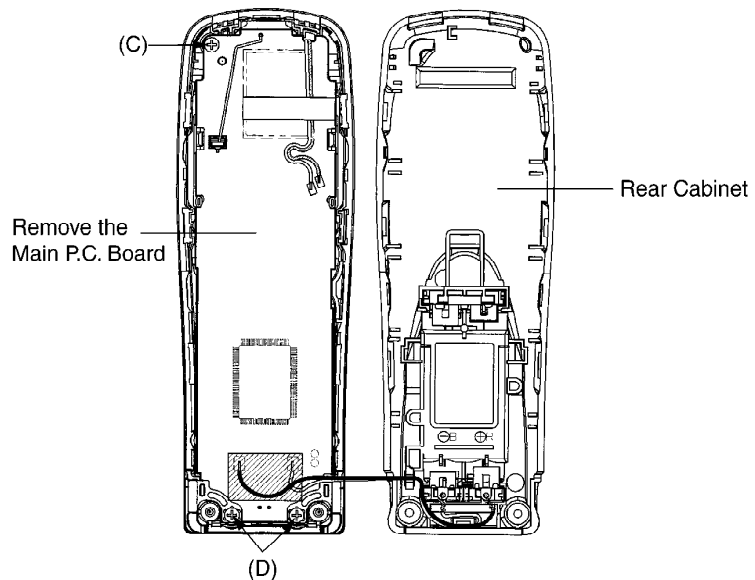
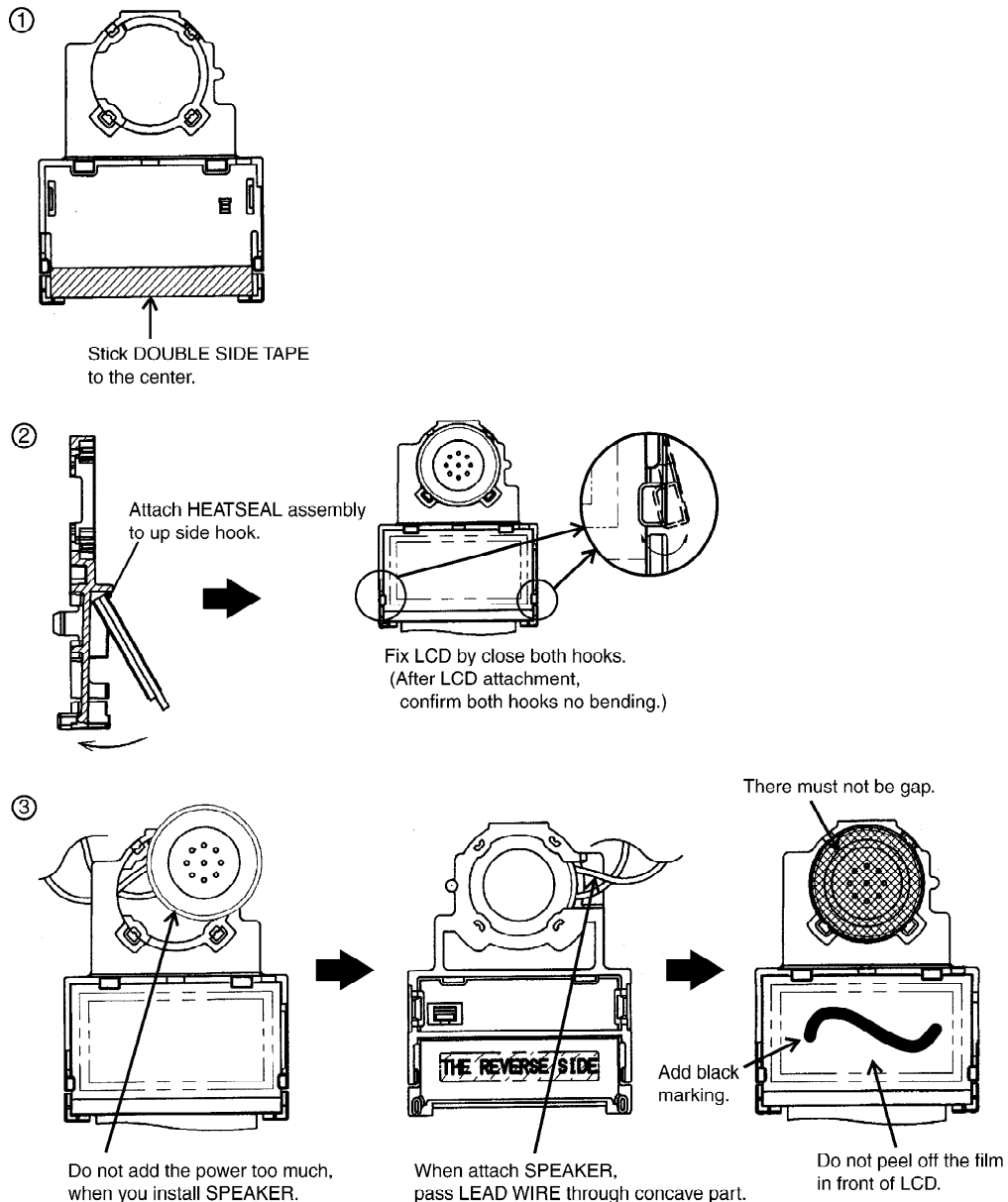


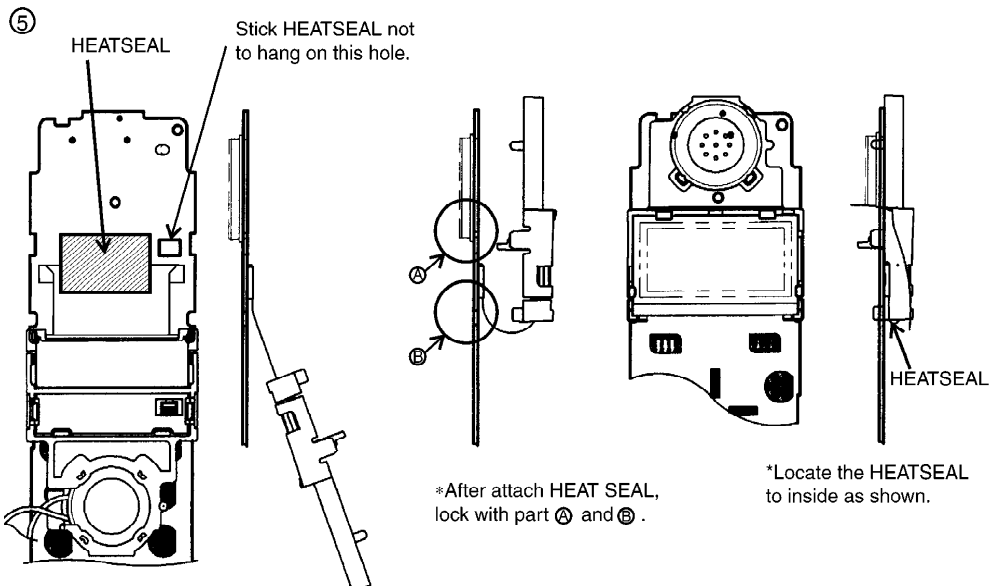
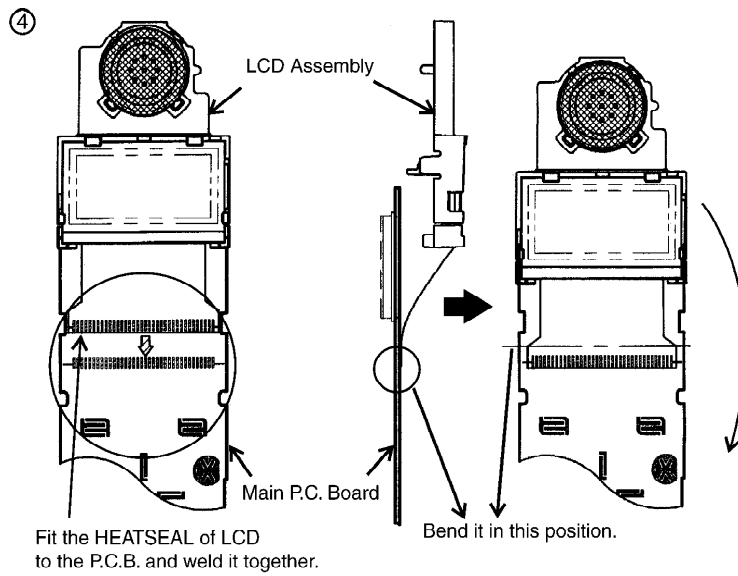
Fig. 4

Shown in Fig.-	To Remove	Remove
3	Rear Cabinet	Screws (2 × 10).....(B) × 2
4	Antenna	Screw (2 × 8).....(C) × 1
4	Main P.C. Board	Screws (2 × 8).....(D) × 2
		Main P.C. Board

10. ASSEMBLY INSTRUCTIONS

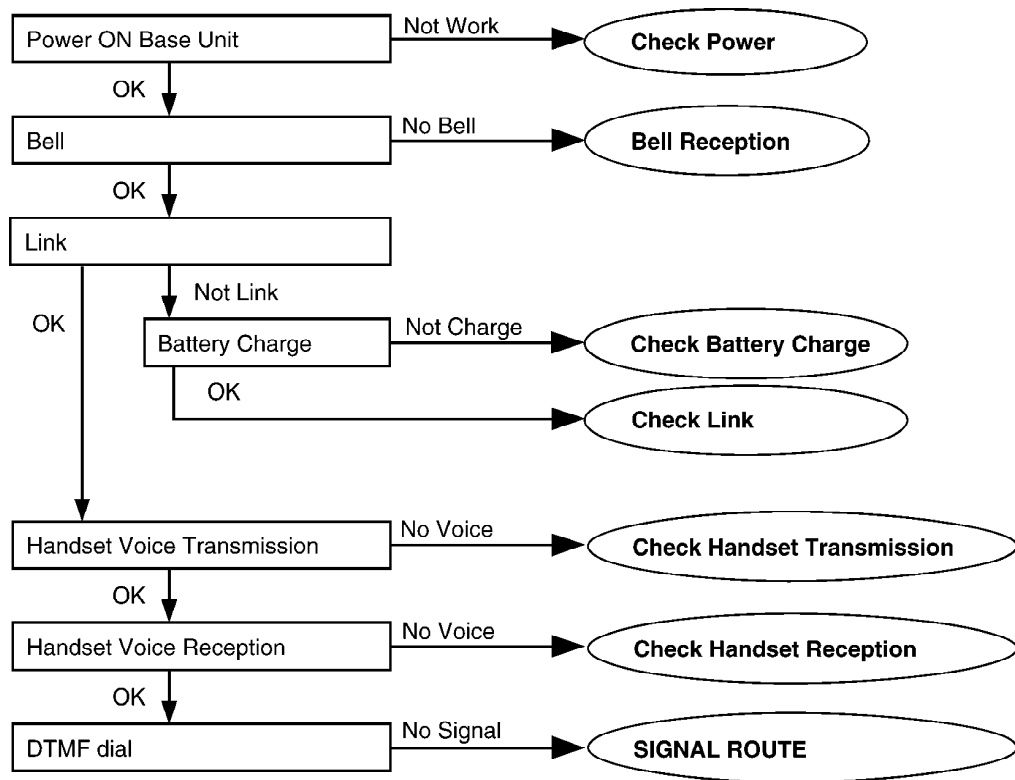
10.1. Fix LCD and PCB





11. TROUBLESHOOTING GUIDE

Flow Chart



Cross Reference:

[Check Power \(\)](#)

[Bell Reception \(\)](#)

[Check Battery Charge \(\)](#)

[Check Link \(\)](#)

[Check Handset Transmission \(\)](#)

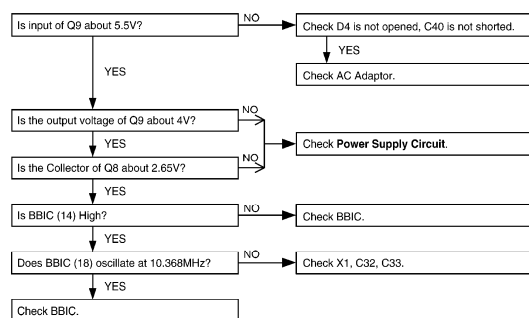
[Check Handset Reception \(\)](#)

[SIGNAL ROUTE \(\)](#)

11.1. Check Power

11.1.1. Base Unit

Is the AC Adaptor inserted into AC outlet? (Check AC Adaptor's specification.)



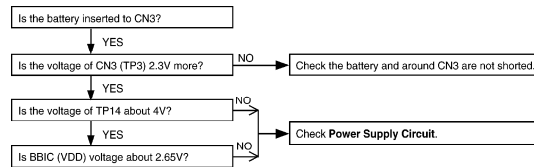
Cross Reference

Power Supply Circuit ()

Note:

BBIC is IC2.

11.1.2. Handset



Cross Reference

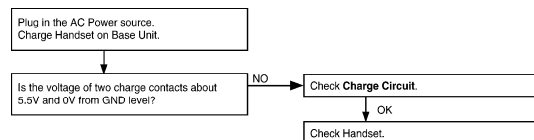
Power Supply Circuit/Reset Circuit ()

Note:

BBIC is IC1.

11.2. Check Battery Charge

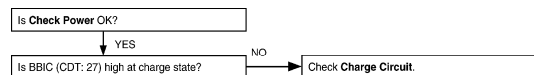
11.2.1. Base Unit



Cross Reference:

Charge Circuit ()

11.2.2. Handset



Cross Reference:

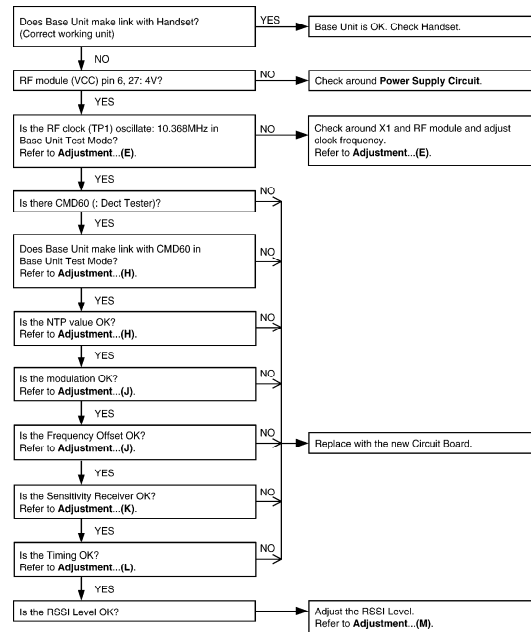
Check Power ()

Charge Circuit ()

Note:
BBIC is IC1.

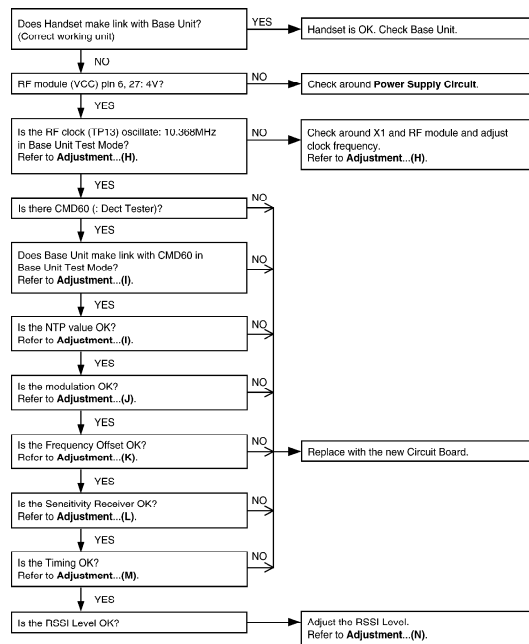
11.3. Check Link

11.3.1. Base Unit



Cross Reference:
Power Supply Circuit ()
Adjustment ()

11.3.2. Handset

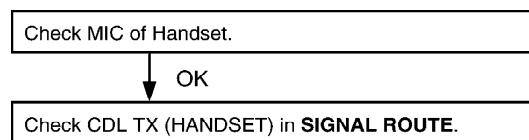


Cross Reference

Power Supply Circuit ()

Adjustment ()

11.4. Check Handset Transmission



Cross Reference:

SIGNAL ROUTE ()

11.5. Check Handset Reception



Cross Reference:

HOW TO CHECK THE HANDSET SPEAKER ().

SIGNAL ROUTE ()

11.6. Check Call ID

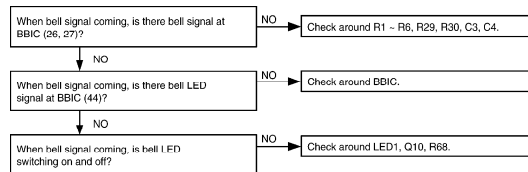
Check DTMF TONE TEL OUT in **SIGNAL ROUTE**.

Cross Reference:

SIGNAL ROUTE ()

11.7. Bell Reception

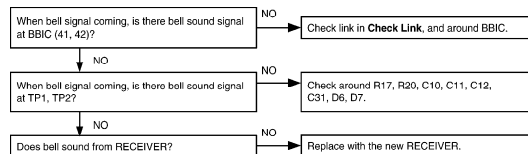
11.7.1. Base Unit



Note:

BBIC is IC2.

11.7.2. Handset



Cross Reference:

Telephone Line Interface ()

Check Link ()

Note:

BBIC is IC1.

12. CHECK PROCEDURE (BASE UNIT)

12.1. Preparation

12.1.1. Equipment Required

- DECT tester: Romde & Schwarz, CMD 60 is recommended.
- Frequency counter: it must be precise to be able to measure 1Hz (precision;±4ppm).
Hewlett Packard, 53131A is recommended.

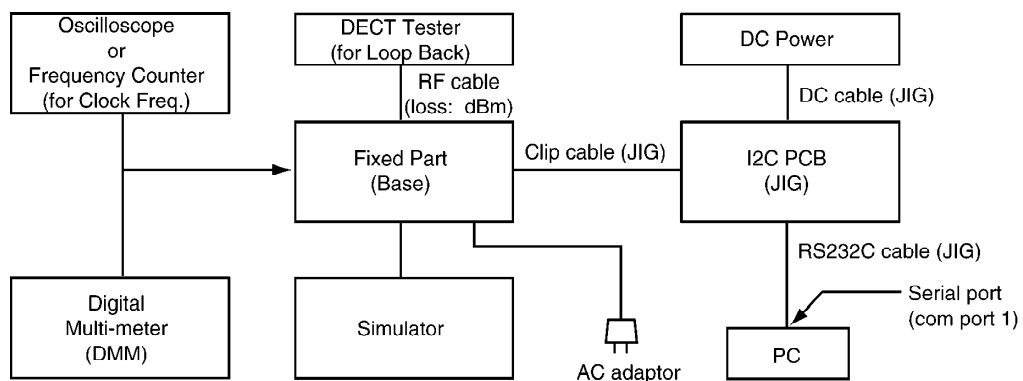
- DC power: it must be able to output at least 1A current under 9V.
- Digital multi-meter (DMM): it must be able to measure voltage and current.
- Oscilloscope

12.1.2. JIGs and PC

- EEPROM serial JIGs
 1. I2C PCB: PQZZTCD705BX
 2. RS232C cable: PQZZ1CD705BX
 3. Clip cable: PQZZ2CD705BX
 4. DC cable: PQZZ3CD705BX
- PC which runs in DOS mode
- Batch file for setting: PQZZTCD410E

12.2. PC Setting

12.2.1. Connections



12.2.2. PC Setting

1. Open a window of MS-DOS mode from the start-up menu.
2. Change a directory to the one with “RTX_COM” contained.
3. Type “SET RTX_COM=1” from the keyboard (when COM port 1 is used for the connection).
4. Type “doskey”.

Note:

See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of EEPROM	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
setfreq	adjust Frequency of RFIC	Type "setfreq nn nn".
hookoff	off-hook mode on Base	Type "hookoff".
hookon	on-hook mode on Base	Type "hookon".
Getchk	Read checksum	Type "getchk".
Wreeprom	write eeprom	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.

13. CHECK PROCEDURE (HANDSET)

13.1. Preparation

13.1.1. Equipment Required

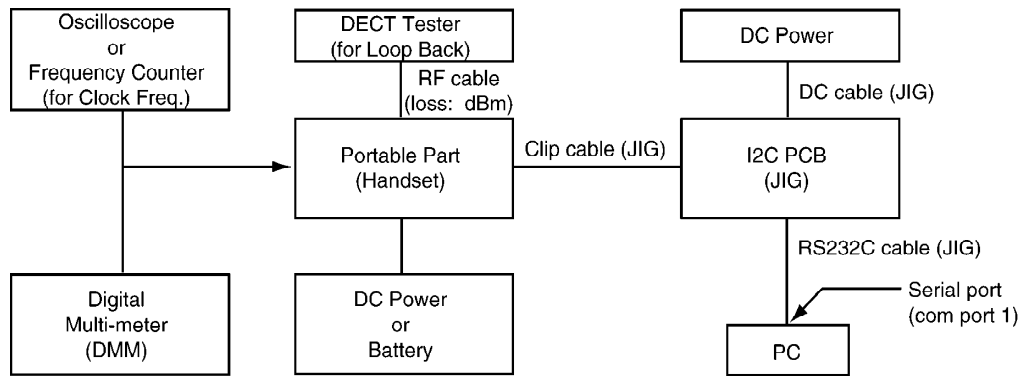
- DECT tester: Romde & Schwarz, CMD 60 is recommended.
- Frequency counter: it must be precise to be able to measure 1Hz (precision; ± 4 ppm).
Hewlett Packard, 53131A is recommended.
- DC power: it must be able to output at least 1A current under 2.4V.
- Digital multi-meter (DMM): it must be able to measure voltage and current.
- Oscilloscope

13.1.2. JIGs and PC

- EEPROM serial JIGs
 1. I2C PCB: PQZZTCD705BX
 2. RS232C cable: PQZZ1CD705BX
 3. Clip cable: PQZZ2CD705BX
 4. DC cable: PQZZ3CD705BX
- PC which runs in DOS mode.
- Batch file for PC setting: PQZZTCD410E

13.2. PC Setting

13.2.1. Connections



13.2.2. PC Setting

1. Open a window of MS-DOS mode from the start-up menu.
2. Change a directory to the one with “RTX_COM” contained.
3. Type “SET RTX_COM=1” from the keyboard (when COM port 1 is used for the connection).
4. Type “doskey”.

Note:

See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of EEPROM	Type “rdeeprom 00 00 FF”, and the data from address “00 00” to “FF” is read out.
readid	Read ID (RFPI)	Type “readid”, and the registered ID is read out.
writeid	Write ID (RFPI)	Type “writeid 00 18 E0 0E 98”, and the ID “0018 E0 0E 98” is written.
setfreq	adjust Frequency of RFIC	Type “setfreq nn nn”.
Getchk	Read checksum	Type “getchk”.
Wreeprom	write eeprom	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.

14. ADJUSTMENTS (BASE UNIT)

If your unit have below symptoms, adjust or confirm each item using remedy column from the table.

Symptom	Remedy
The base unit does not respond to a call from handset.	Make adjustments in item (I)~(M)
The base unit does not transmit or the transmit frequency is off.	Make adjustments in item (H)~(J), (L)
The transmit frequency is off.	Make confirmation in item (H)~(J), (L)
The transmit power output is low, and the operating distance between base unit and handset is less than normal.	Make confirmation in item
The reception sensitivity of base unit is low with noise.	Make confirmation in item
The transmit level is high or low.	Make adjustments in item
The reception level is high or low.	Make adjustments in item
The unit does not link.	Make confirmation in item

* : Refer to **Adjustment** ()

14.1. Adjustment

	Items	Adjustment Point	Procedure*	
(A)	2.65V Supply Confirmation	-	1. Confirm that the voltage between TP187 and GND is $2.65V \pm 0.2V$.	IC C: C: R R C
(B)	4.0V Supply Confirmation	-	1. Confirm that the voltage between TP91 and GND is $4.0V \pm 0.2V$.	IC R: D C:

	Items	Adjustment Point	Procedure*	
(C)	VBACK Status Confirmation	-	1. Confirm that the voltage between J102 and GND is $0V \pm 0.4V$.	IC C: C: R R C X
(D) *	BBIC Selftest	-	1. BBIC Selftest (Execute the command "getchk"). 2. Confirm the returned checksum value. 3. Execute the command "getver". 4. Confirm the returned checksum value.	IC
(E) *	BBIC Clock Adjustment	TP1	1. Execute the command "deactmac". 2. Execute the command "conttx". 3. Adjust the frequency of TP1 executing the command "setfreq 00 xx (where xx is the value)" so that the reading of the frequency counter is $10.368000MHz \pm 3Hz$.	I C
(F) *	Hookswitch Check with DC Characteristics	-	1. Connect J1 (Telephone Socket) to Tel-simulator which is connected with 600Ω . 2. Set line voltage to 48V and line current to 40mA. 3. Execute the command "hookoff". 4. Confirm that the line voltage is $40V \pm 5V$. 5. Execute the command "hookon". 6. Confirm that the line current is $0V + 2V$.	IR (

	Items	Adjustment Point	Procedure*	
(G) *	DTMF Generator Confirmation	-	1. Connect J1 (Telephone Socket) to DTMF tester. 2. Execute the command "hookoff" and "dtmf_up". 3. Confirm that the high frequency group is -6.5dBm ~ -9.5dBm. 4. Execute the command "dtmf_lo". 5. Confirm that the low frequency group is -9.0dBm ~ -12.0dBm.	IC R: C R: C C F F
(H) *	Transmitted Power Confirmation	-	1. Configure the DECT tester (CMD60) as follows; <Setting> -Testmode: FP -Traffic Channel: 5 -Traffic Slot: 4 -Mode: Loopback -PMID: 0000 -Antenna set to 0 2. Execute the command "testmode". 3. Initiate connection from DECT tester. 4. Confirm that the NTP value at ANT is 20dBm ~ 25dBm.	I C: C(C(C(C D/ C: R:

	Items	Adjustment Point	Procedure*	
(I)	Modulatoin Check and Adjustment	ANT	<p>Follow steps 1 to 3 of (H) above.</p> <p>1. Confirm that the B-Field Modulation is 340kHz/div ~ 402kHz/div using data type Fig31.</p> <p>2. Adjust the B-Field Modulation if required. (Execute the command "readmod" and "writemod xx", where xx is the value.)</p>	<p>I</p> <p>C/</p> <p>C/</p> <p>C/</p> <p>C</p> <p>D/</p> <p>C/</p> <p>R/</p>
(J)	Frequency Offset Confirmation	-	<p>Follow steps 1 to 3 of (H) above.</p> <p>1. Confirm that the frequency offset is $< \pm 40\text{kHz}$.</p>	<p>I</p> <p>C/</p> <p>C/</p> <p>C/</p> <p>C</p> <p>D/</p> <p>C/</p> <p>R/</p>

	Items	Adjustment Point	Procedure*	
(K)	Sensitivity Receiver Confirmation	-	<p>Follow steps 1 to 3 of (H) above.</p> <p>1. Set DECT tester power to -88dBm.</p> <p>2. Confirm that the BER is < 1000ppm.</p>	<p>I</p> <p>C/</p> <p>C/</p> <p>C/</p> <p>C</p> <p>D/</p> <p>C/</p> <p>R/</p>
(L)	Timing Confirmation	-	<p>Follow steps 1 to 3 of (H) above.</p> <p>1. Confirm that the Timing accuracy is < ± 5.0ppm.</p>	<p>I</p> <p>C/</p> <p>C/</p> <p>C/</p> <p>C</p> <p>D/</p> <p>C/</p> <p>R/</p>

	Items	Adjustment Point	Procedure*	
(M) *	RSSI Level Confirmation	-	<p>Follow steps 1 to 3 of (H) above.</p> <ol style="list-style-type: none"> 1. Set DECT tester power to -88dBm. 2. Execute the command "readrssi". 3. Confirm that the returned value is 0x35 ± 8 (hex). 	<p>I</p> <p>C/</p> <p>C/</p> <p>C/</p> <p>C</p> <p>D/</p> <p>C/</p> <p>R/</p>

	Items	Adjustment Point	Procedure*	
(N) *	Receive Audio Check and Adjustment	ANT J1	<p>1. Configure the DECT tester (CMD60) as follows; <Setting></p> <p>-Testmode: FP -Mode: Normal -PMID: 0000</p> <p>2. Execute the command "testmode". 3. Initiate connection from DECT tester. 4. Execute the command "hookoff". 5. Execute the command "openau".</p> <p>6. Connect J1 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 7. Set line voltage to 48V and line current to 40mA. 8. Connect DECT tester to Tel-simulator. 9. Input audio signal (200mVrms/1kHz tone) to Tel-simulator. <DECT tester setting></p> <p>-Scramble: On -AF Gen to ADPCM: Off -AF Meter Input: ADPCM -AF Gen Frequency: 1000Hz -AF Gen Level: 200mVrms</p> <p>10. Confirm hearing tone: 360mVrms \pm 60mVrms 11. Adjust audio level if required. (Make sure current value using "getspkrgain". And then execute the command "setspkrgain xx", where xx is the value.) 12. Confirm that the B-field audio distortion with DECT tester is < 5 %.</p>	IC C: R (C I F C: C(C(C D/ C: R:

	Items	Adjustment Point	Procedure*
(O) *	Transmit Audio Check and Adjustment	ANT J1	<p>1. Configure the DECT tester (CMD60) as follows; <Setting></p> <p>-Testmode: FP -Mode: Normal -PMID: 0000</p> <p>2. Execute the command "testmode". 3. Initiate connection from DECT tester. 4. Execute the command "hookoff". 5. Execute the command "openau".</p> <p>6. Connect J1 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 7. Set line voltage to 48V and line current to 40mA. 8. Input audio signal (30mVrms/1kHz tone) to from DECT tester. <DECT tester setting></p> <p>-Scramble: On -AF Gen to ADPCM: On -AF Meter Input: AF Voltm -AF Gen Frequency: 1000Hz -AF Gen Level: 30mVrms</p> <p>9. Confirm hearing tone: 270mVrms \pm 45mVrms 10. Adjust audio level if required. (Make sure current value using "getmicgain". And then execute the command "setmicgain xx", where xx is the value.) 11. Confirm that the audio distortion at 600R of Tel-simulator is < 5 %.</p>

Note:

After the measuring, sock up the solder of TP.

* : **PC Setting** () is required beforehand.

The connection of adjustment equipment are as shown in **Adjustment Standard (Base Unit)** ().

14.2. Adjustment Standard (Base Unit)

When connecting the Simulator Equipments for checking, please refer to below.

14.2.1. Component View

Note:

(H) - (O) is referred to **ADJUSTMENTS (BASE UNIT)** ()

14.2.2. Flow Solder Side View

Note:

(A) - (O) is referred to **ADJUSTMENTS (BASE UNIT)** ()

15. ADJUSTMENTS (HANDSET)

If your unit have below symptoms, adjust or confirm each item using remedy column from the table.

Symptom	Remedy
The movement of Battery Low indicator is wrong.	Make confirmation in item (F)~(G)
The handset does not respond to a call from base unit.	Make adjustments in item (H), (J)~(N)
The handset does not transmit or the transmit frequency is off.	Make adjustments in item (H)~(K), (M)
The transmit frequency is off.	Make confirmation in item (H)~(K), (M)
The transmit power output is low, and the operating distance between base unit and handset is less than normal.	Make confirmation in item
The reception sensitivity of base unit is low with noise.	Make confirmation in item
Dose not link between base unit and handset.	Make confirmation in item (H)~(N)
The reception level is high or low.	Make adjustments in item
The transmit level is high or low.	Make adjustments in item

* : Refer to **Adjustment** ()

15.1. Adjustment

	Items	Adjustment Point	Procedure*	
(A)	4.0V Supply Confirmation	-	1. Confirm that the consumption current is < 200mA , that is, there is no short circuit. 2. Confirm that the voltage between TP14 and GND is $4.1V \pm 0.2V$.	I F E C F C
(B)	VBACK Status Confirmation	-	1. Confirm that the voltage between TP18 and GND is $0V \pm 0.4V$.	I F E C F C
(C)	BBIC Selftest	-	1. BBIC Selftest (Execute the command "getchk"). 2. Confirm the returned checksum value.	I
(D)	Charge Control Check & Charge Current Monitor Confirmation	-	1. Apply 6V between TP5(+) and TP6(-) with current limit of PSU to 200mA. 2. Confirm that the charge current is ON/OFF. 3. SW to decrease current limit of PSU to 100mA. 4. Confirm that the charge current is stable.	I I F C
(E) *	Charge Detection (OFF) Confirmation	-	1. Stop supplying 6V to TP5(+) and TP6(-). 2. Execute the command "charge". 3. Confirm that the returned value is 0x00 (hex).	I I F C

	Items	Adjustment Point	Procedure*	
(F) *	Battery Monitor Confirmation	-	1. Apply 2.3V \pm 0.005V between TP3(+) and TP4(-). 2. Execute the command "readbatt". 3. Subtract "0x06" from returned value which define "XX" and confirm that the "XX" is 0x92 ~ 0xA2 (hex). 4. Execute the command "WRTBAT2 XX".	I I F C
(G)	Battery low Confirmation	-	1. Apply 2.40V between TP3(+) and TP4(-). 2. Confirm that there is no Speaker sound (Battery low alarm). 3. Apply 2.20V between TP3(+) and TP4(-). 4. Confirm that there is Speaker sound (Battery low alarm).	I R C C
(H) *	BBIC Clock Adjustment	TP19	1. Execute the command "conttx". 2. Adjust the frequency of TP19 executing the command "setfreq 00 xx (where xx is the value)" so that the reading of the frequency counter is 10.368000MHz \pm 0.000003Hz.	I I
(I)*	Transmitted Power Confirmation	TP15	1. Configure the DECT tester (CMD60) as follows; <Setting> -Testmode: PP -RFPI: 0102030405 -Traffic Channel: 5 -Traffic Slot: 4 -Mode: Loopback 2. Execute the command "testmode". 3. Execute the command "regcmd60" 4. Initiate connection from DECT tester. 5. Confirm that the NTP value at A201 (TP15) is 20dBm ~ 25dBm	I C C C C

	Items	Adjustment Point	Procedure*	
(J)	Modulatoin Check and Adjusment	TP15	<p>Follow steps 1 to 4 of (I) above.</p> <p>1. Confirm that the B-Field Modulation is 340kHz/div ~ 402kHz/div using data type Fig31.</p> <p>2. Adjust the B-Field Modulation if required. (Execute the command "Readmod" and "Writemod xx", where xx is the value.)</p>	IC C C! C! C!
(K)	Frequency Offset Confirmation	-	<p>Follow steps 1 to 4 of (I) above.</p> <p>1. Confirm that the frequency offset is < ± 40kHz.</p>	IC C C! C! C!
(L)	Sensitivity Receiver Confirmation	-	<p>Follow steps 1 to 4 of (I) above.</p> <p>1. Set DECT tester power to -88dBm.</p> <p>2. Confirm that the BER is < 1000ppm.</p>	IC C C! C! C!

	Items	Adjustment Point	Procedure*
(M)	Timing Confirmation	-	<p>Follow steps 1 to 4 of (I) above.</p> <p>1. Confirm that the Timing accuracy is $< \pm 10\text{ppm}$.</p>
(N) *	RSSI Level Confirmation	-	<p>Follow steps 1 to 4 of (I) above.</p> <p>1. Set DECT tester power to -88dBm.</p> <p>2. Execute the command "readrssi"</p> <p>3. Confirm that the returned value is $0x34 \pm A$ (hex).</p>
(O) *	Receive Audio Check and Adjustment	TP15	<p>1. Configure the DECT tester (CMD60) as follows;</p> <p><Setting></p> <p>-Testmode: PP</p> <p>-Mode: Nomal</p> <p>-RFPI: 0102030405</p> <p>2. Execute the command "testmode".</p> <p>3. Execute the command "regcmd60"</p> <p>4. Initiate connection from DECT tester.</p> <p>5. Execute the command "openaudio".</p> <p>6. Confirm that the value of EEPROM address "F3F" is "02". (If the value is not "02", set "02" and power off and power on, and return to clause 2.)</p> <p>7. Input audio signal (50mVrms/1kHz tone) from DECT tester.</p> <p><DECT tester setting></p> <p>-Scramble: On</p> <p>-AF Gen to ADPCM: On</p> <p>-AF Meter Input: AF Voltm</p> <p>-AF Gen Frequency: 1000Hz</p> <p>-AF Gen Level: 50mVrms</p> <p>8. Confirm hearing tone: $300\text{mV} \pm 250\text{mV}$ (Just check Audio path)</p> <p>9. Confirm that the audio distortion with DECT tester is $< 5\%$.</p>

	Items	Adjustment Point	Procedure*
(P)	Transmit Audio Check and Adjustment	TP15	<p>1. Configure the DECT tester (CMD60) as follows; <Setting></p> <p>-Testmode: FP -Mode: Normal -RFPI: 0102030405</p> <p>2. Execute the command "testmode". 3. Execute the command "regcmd60". 4. Initiate connection from DECT tester. 5. Execute the command "openaudio". 6. Confirm that the value of EEPROM address "F3F" is "02". (If the value is not "02", set "02" and power off and power on, and return to clause 2.) 7. Input audio signal (30mVrms/1kHz tone) to from DECT tester. <DECT tester setting></p> <p>-Scramble: On -AF Gen to ADPCM: Off -AF Meter Input: ADPCM -AF Gen Frequency: 1000Hz -AF Gen Level: 10mVrms</p> <p>8. Confirm hearing tone: 300mV ± 250mV (Just check Audio path) 9. Confirm that the audio distortion with DECT tester is < 5 %.</p>

Note:

After the measuring, sock up the solder of TP.

* : **PC Setting** () is required beforehand.

The connection of adjustment equipment are as shown in **Adjustment Standard (Handset)** ().

15.2. Adjustment Standard (Handset)

When connecting the Simulator Equipments for checking, please refer to below.

Note:

(A) - (P) is referred to **ADJUSTMENTS (HANDSET)** ()

16. RF SPECIFICATION

16.1. Base Unit

Item	Value	Refer to -. *	Remar
TX Power	More than 20 dBm ~ 25 dBm	Adjustment (H)	
Modulation	340 kHz/div ~ 402 kHz/div	Adjustment (I)	Data type:
Frequency Offset	-40 kHz ~ +40 kHz	Adjustment (J)	
RX Sensitivity	< 1000 ppm	Adjustment (K)	
Timing Accuracy	-1.0 ppm ~ +1.0 ppm < ± 5 ppm	Adjustment (L)	
RSSI Level	0x35 hex ± 8 hex	Adjustment (M)	

* : Refer to [Adjustment](#) ()

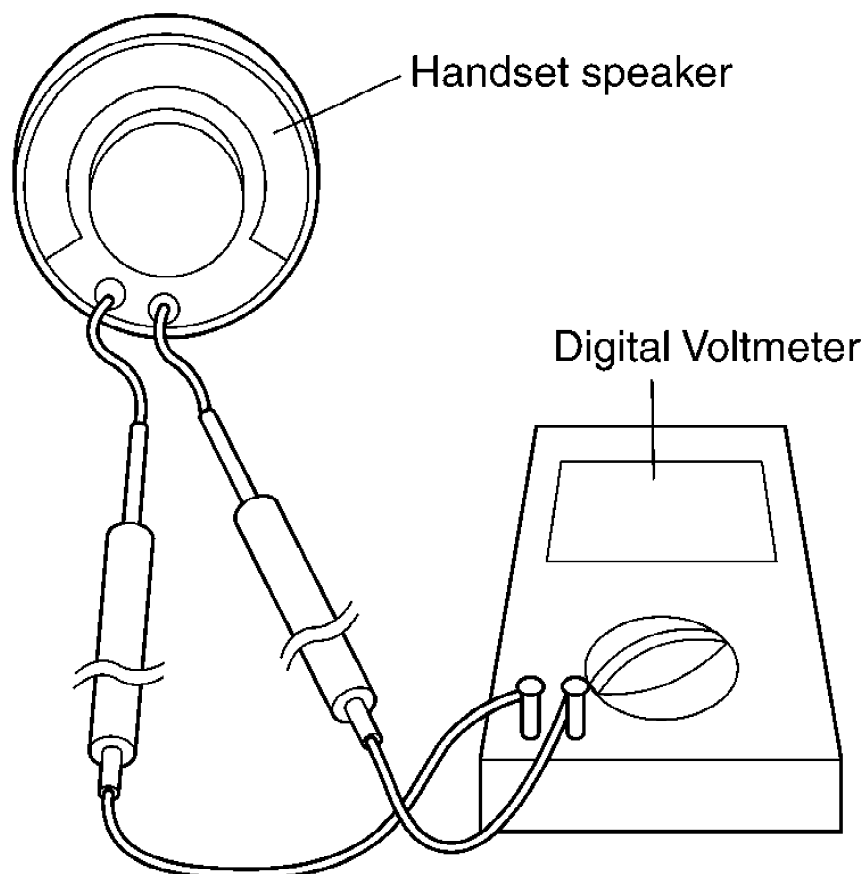
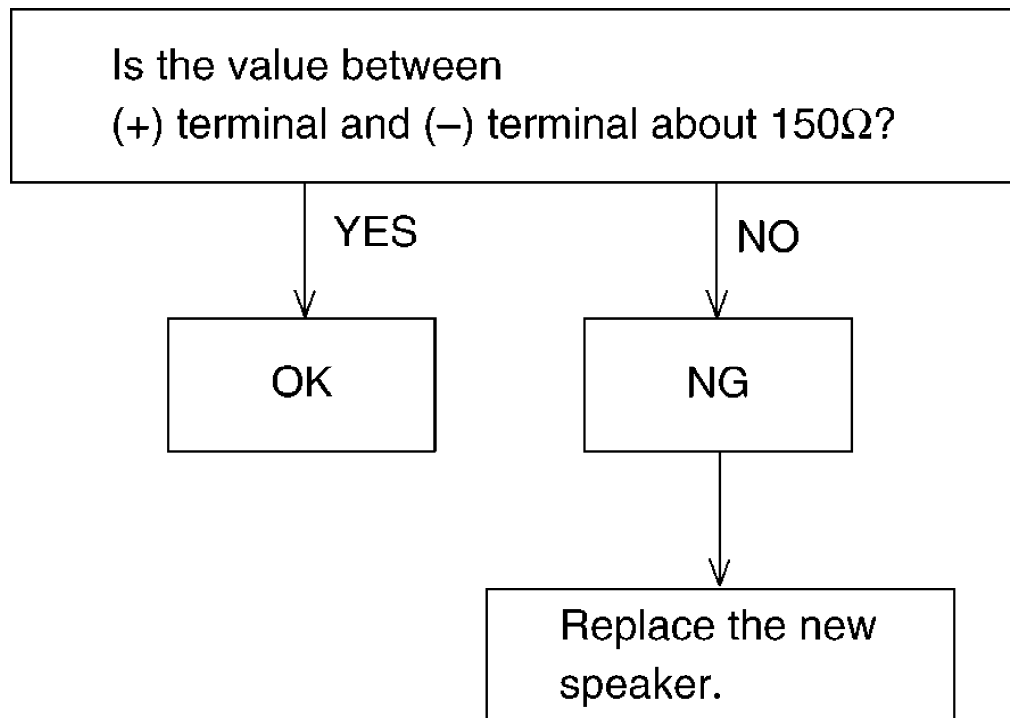
16.2. Handset

Item	Value	Refer to -. **	Remar
TX Power	More than 20 dBm ~ 25 dBm	Adjustment (I)	
Modulation	340 kHz/div ~ 402 kHz/div	Adjustment (J)	Data type:
Frequency Offset	-40 kHz ~ +40 kHz	Adjustment (K)	
RX Sensitivity	<1000 ppm	Adjustment (L)	
Timing Accuracy	-1.0 ppm ~ +1.0 ppm < ± 10 ppm	Adjustment (M)	
RSSI Level	0x34 hex ± A hex	Adjustment (N)	

** : Refer to [Adjustment](#) ()

17. HOW TO CHECK THE HANDSET SPEAKER

1. Prepare the digital voltmeter, and set the selector knob to ohm meter.
2. Put the probes at the speaker terminals as shown below.



18. FREQUENCY TABLE (MHz)

Channel No	BASE UNIT		HANDSET	
	Transmit Frequency	Receive Frequency	Transmit Frequency	Receive Fr
1	1897.344	1897.344	1897.344	1897.3
2	1895.616	1895.616	1895.616	1895.6
3	1893.888	1893.888	1893.888	1893.8
4	1892.160	1892.160	1892.160	1892.1
5	1890.432	1890.432	1890.432	1890.4
6	1888.704	1888.704	1888.704	1888.7
7	1886.976	1886.976	1886.976	1886.9
8	1885.248	1885.248	1885.248	1885.2
9	1883.520	1883.520	1883.520	1883.5
10	1881.792	1881.792	1881.792	1881.7

Note:

Channel No. 10: In the Test Mode on Base Unit and Hnadset.

19. BLOCK DIAGRAM (BASE UNIT)

20. CIRCUIT OPERATION (BASE UNIT)

20.1. Outline

Base Unit consists of the following ICs as shown in **BLOCK DIAGRAM (BASE UNIT)** ().

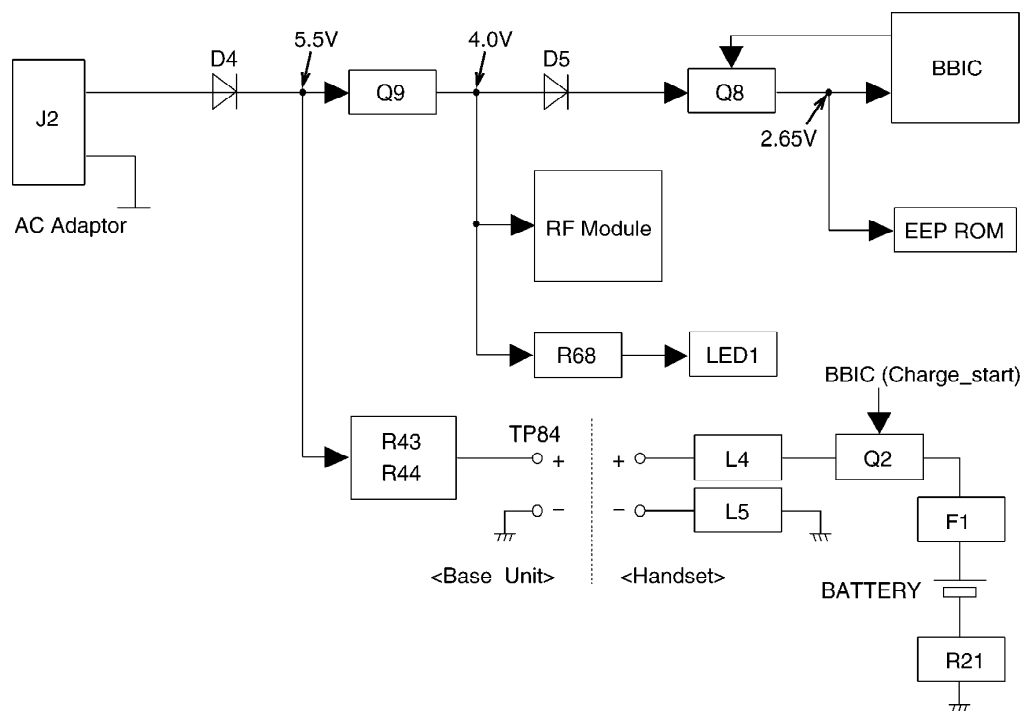
- DECT BBIC (Base Band IC): IC2
- Handling all the audio, signal and data processing needed in a DECT base unit
- Controlling the DECT specific physical layer and radio section (Burst Module Controller section)
- ADPCM codec filter for speech encoding and speech decoding (DSP section)
- Echo-cancellation and Echo-suppression (DSP section)
- Any tones (tone, sidetone, ringing tone, etc.) generation (DSP section)
- DTMF receiver (DSP section)
- Clock Generation for RF Module
- ADC, DAC, timer, and power control circuitry
- All interfaces (ex: RF module, EEPROM, LED, Analog Front End, etc.)
- RF Module: IC3
- PLL Oscillator

- Detector
- Compress/Expander
- First/Second Mixer
- Amplifier for transmission and reception
- EEPROM: IC1
- Temporary operating parameters (for RF, etc.)
- Additionally,
- Power Supply Circuit (+4.0V, +2.65V output)
- Crystal Circuit (10.368MHz)
- Charge Circuit
- Telephone Line Interface Circuit

20.2. Power Supply Circuit

The power is supplied to the DECT BBIC, RF Module, EEPROM, Relay Coil, LED and Charge Contact from AC Adaptor (+6V) as shown in Fig.101. The power supply is as follows;

- DECT BBIC (IC2): J2(+6V) → D4 → Q9 → D5 → Q8 → IC2
- RF Module (IC3): J2(+6V) → D4 → Q9 → IC3
- EEPROM (IC1): J2(+6V) → D4 → Q9 → D5 → Q8 → IC2 → IC1
- LED (LED1): J2(+6V) → D4 → Q9 → R68 → LED1
- Charge Contact (TP84): J2(+6V) → D4 → R43, R44 → TP84



20.3. Telephone Line Interface

<Function>

- Bell signal detection
- Clip signal detection
- ON/OFF hook circuit
- Metering pulse detection
- Polarity reversal signal detection
- Audio circuits

Bell & Clip (: Calling Line Identification Presentation: Caller ID) signal detection:

In the standby mode, Q2 is open to cut the DC loop current and decrease the ring load.

When ring voltage appears at the TP3 (A) and TP40 (B) leads (when the telephone rings), the signal is transferred as follows;

- A → C4 → R2 → R29 → IC2 (DLP) [BELL & CLIP]
- B → C3 → R1 → R30 → IC2 (DLP) [BELL & CLIP]

ON/OFF hook circuit:

In the standby mode, Q2 is open, and connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an off-hook condition.

When IC2 detects a ring signal or press the TALK Key onto the handset, Q3 turns on and then Q2 turns on, thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the loop current.

- A → R77 → D2 → Q2 → R8 → Q3 → D2 → B [OFF HOOK]

Polarity reversal detection:

The polarity reversal is detected by monitoring the line voltage change as follows;

- A → R81 → IC2 (AD2) [POLARITY REVERSAL]
- B → R53 → IC2 (AD3) [POLARITY REVERSAL]

20.4. Transmitter/Receiver

Base Unit and Handset mainly consist of RF Module and DECT BBIC.

Base Unit and Handset transmit/receive voice signal and data signal through the antenna on carrier frequency.

Signal Pass:

*Refer to **SIGNAL ROUTE** ().

20.4.1. Transmitter Block

The voice signal input from the TEL LINE interface goes to RF Module (IC3) through DECT BBIC (IC2) as shown in **BLOCK DIAGRAM (BASE UNIT)** ().

The voice signal passes through the analog part of IC2 where it is amplified and converted to a digital audio stream signal. The burst switch controller processes this stream performing encryption and scrambling, adding the various other fields to produce the GAP (Generic Access Profile) standard DECT frame, assigning to a time slot and channel etc.

In IC3, the carrier frequency is changing, and frequency modulated RF signal is generated and amplified, and radiated from antenna. Handset detects the voice signal or data signal in the circuit same as the following explanation of Receiver Block.

20.4.2. Receiver Block

The signal of 19.2 MHz band (18.81792 MHz ~ 18.97344 MHz) which is input from antenna is input to IC3 as shown in **BLOCK DIAGRAM (BASE UNIT)** ().

In IC3, the signal of 19.2 MHz band is downconverted to 864 kHz signal and demodulated, and goes to IC2 as GAP (Generic Access Profile) standard DECT frames. It passes through the decoding section burst switch controller where it separates out the frame information and performs de-encryption and de-scrambling as required. It then goes to the DSP section where it is turned back into analog audio. This is amplified by the analog front end, and goes to the TEL LINE Interface.

21. BLOCK DIAGRAM (HANDSET)

22. CIRCUIT OPERATION (HANDSET)

22.1. Outline

Handset consists of the following ICs as shown in **BLOCK DIAGRAM (HANDSET)** ().

- DECT BBIC (Base Band IC): IC1
- All data signals (forming/analyzing ACK or CMD signal)
- All interfaces (ex: Key, Detector Circuit, Charge, DC/DC Converter, EEPROM, LCD)
- RF Module: IC3
- PLL Oscillator
- Detector
- Compress/Expander
- Amplifier for transmission and reception

22.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

When power on the Handset, the voltage is as follows;

BATTERY(2.2 V ~ 2.6V: TP3) → TP14(4V) → IC3(6, 27), D3 → IC1(37) → IC1(39, 63) (2.65V)

The Reset signal generates R19, C23 and 2.65V.

22.3. Charge Circuit

Circuit Operation:

When charging the handset on the Base Unit, the charge current is as follows;

DC+(5.5V ~ 6V) → D4 → R43, R44 → CHARGE+(Base) → CHARGE+(Handset) → L4 → Q2 → F1 → BATTERY+ ... Battery ... BATTERY- → R21 → GND → L5 → CHARGE-(Handset) → CHARGE-(Base) → GND → DC-(GND)

In this way, the BBIC on Handset detects the fact that the battery is charged.

The charge current is controlled by switching Q2 of Handset.

Refer to Fig.101 in [Power Supply Circuit](#) ().

22.4. Battery Low/Power Down Detector


Circuit Operation:

"Battery Low" and "Power Down" are detected by BBIC which check the voltage from battery.

The detected voltage is as follows;

- Battery Low

Battery voltage: $V(\text{Batt}) < 2.3\text{V}$

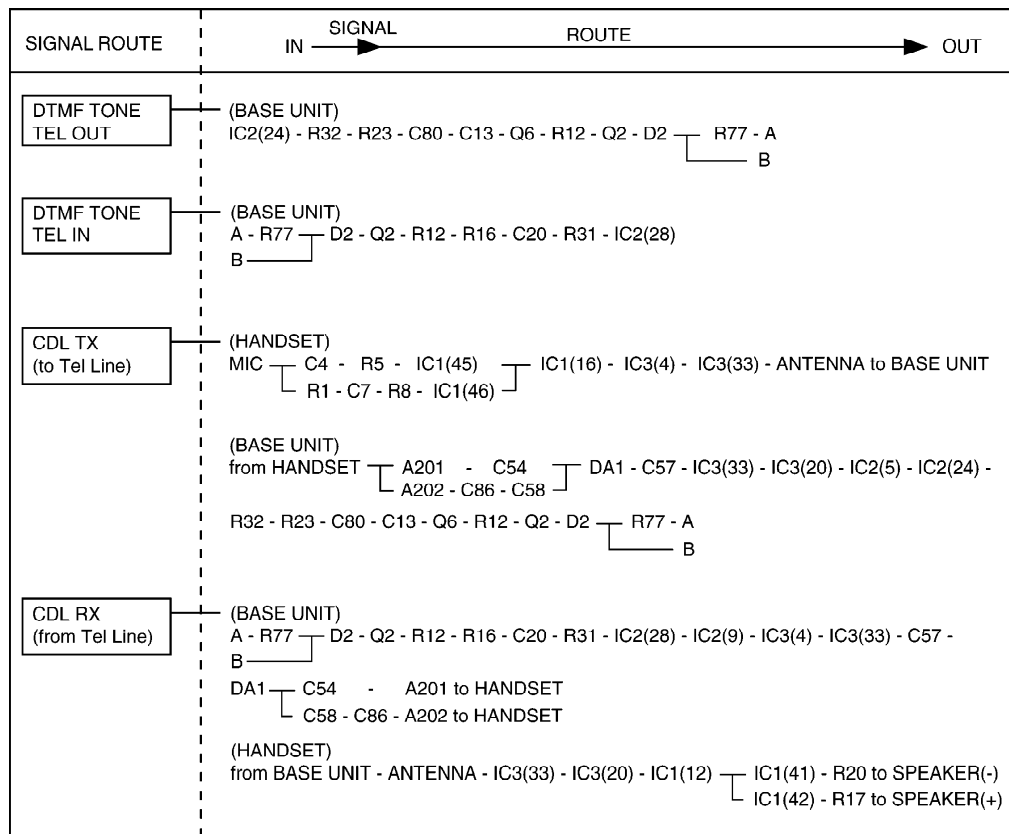
The BBIC detects this level and "" starts flashing and "battery alarm" starts ringing.

- Power Down

Battery voltage: $V(\text{Batt}) < 2.2\text{V}$

The BBIC detects this level and power down.

23. SIGNAL ROUTE



24. CPU DATA (BASE UNIT)

24.1. IC2 (BBIC)

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
1	VDD	-	-	-	-	-
2	VSS	-	-	-	-	-
3	PA_Driver_Amp	D.O	PA_ON	-	PA_OFF	-
4	TX/RX SW	D.O	TX	-	RX	-
5	RX_Data	D.I	Data	-	Data	-
6	PLL_Strobe	D.O	Latch	-	Normal	-
7	PLL_Data	D.O	Active	-	Active	-
8	PLL_Clk	D.O	Active	-	Active	-
9	TX_Data	D.O	Active	-	Active	-
10	(NO USE)	D.O	-	-	-	-
11	RF_System_Clk	D.O	Active	-	Active	-
12	VDD	-	-	-	-	-
13	VSS	-	-	-	-	-
14	RESETQ	A.I	Normal	-	Reset	-
15	VDDPM	D.O	-	-	-	-
16	VSSO	D.I	-	-	-	-
17	LOAD	A.I	-	-	-	-
18	XTAL	A.I	-	-	-	10.368 MHz
19	VDDL	A.I	-	-	-	-

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
20	LRB	A.I	-	-	-	-
21	VDDA	-	-	-	-	-
22	VSSA	-	-	-	-	-
23	Audio_Out_N	A.O	-	-	-	-
24	Audio_Out_P	A.O	-	-	-	-
25	Bandgap_Ref	A.I	-	-	-	-
26	Differential_Line_P	A.I	-	-	-	for Bell Clip
27	Differential_Line_N	A.I	-	-	-	for Bell Clip
28	Audio_In_N	A.I	-	-	-	-
29	ADC_Ref	A.I	-	-	-	-
30	RSSI	A.I	-	-	-	-
31	AD2(MPCINP)	A.I	-	-	-	for Polarity
32	AD3	A.I	-	-	-	for Polarity
33	(NO USE)	D.I	(I_PU)	-	-	-
34	(NO USE)	D.I	(I_PU)	-	-	-
35	(NO USE)	D.I	(I_PU)	-	-	-
36	(NO USE)	D.I	(I_PU)	-	-	-
37	VDD	-	-	-	-	-
38	VSS	-	-	-	-	-
39	Supply_EEP	D.O	(Fixed)	-	-	-
40	Serial_Data(I2C)	D.I/O	Data	-	Data	-
41	Serial_Clk(I2C)	D.O	Active	-	Active	-
42	MODE	D.I	-	-	(Fixed)	-
43	(NO USE)	D.O	-	-	(Fixed)	-
44	BELL/ PAGING_LED	D.O	LED_ON	-	LED_OFF	-
45	VBACK	A.I	-	-	-	-
46	(NO USE)	-	-	-	(I_PD)	-
47	(NO USE)	D.I	-	-	(Fixed)	-
48	VDD	-	-	-	-	-
49	(NO USE)	D.I	-	-	(Fixed)	-
50	(NO USE)	D.I	(Fixed)	-	-	-
51	(NO USE)	D.I	-	-	(Fixed)	-
52	(NO USE)	D.I	-	-	(Fixed)	-
53	VSS	-	-	-	-	-
54	VDD	-	-	-	-	-
55	KEY_IN	D.I	No Key	-	Key	-
56	(NO USE)	D.I/O	-	-	(I_PD)	-
57	(NO USE)	D.I/O	-	-	(I_PD)	-
58	(NO USE)	D.I/O	-	-	(I_PD)	-
59	(NO USE)	D.I/O	-	-	(I_PD)	-
60	(NO USE)	D.I/O	-	-	(I_PD)	-
61	HOOK_CTRL	D.O	Make	-	Break	-
62	(NO USE)	D.I/O	-	-	(I_PD)	-
63	ANT1	D.O	ANT1_ON	-	ANT1_OFF	-

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
64	ANT2	D.O	ANT2_ON	-	ANT2_OFF	-

Note:

I_PU; Internal Pull-Up, I_PD; Internal Pull-Down

25. CPU DATA (Handset)

25.1. IC1 (BBIC)

Pin	Description	I/O	Hi	Hi-z	Remarks
1	LCD_SEGMENT	D.O	Active	-	-
2	LCD_COMMON	D.O	Active	-	-
3	VDD	-	-	-	-
4	VSS	-	-	-	-
5	LCD_COMMON	D.O	Active	-	-
6	LCD_COMMON	D.O	Active	-	-
7	LCD_COMMON	D.O	Active	-	-
8	LCD_COMMON	D.O	Active	-	-
9	LCD_COMMON	D.O	Active	-	-
10	PA_SW	D.O	PA ON	-	-
11	T/R SW	D.O	Transmit	-	-
12	RX_DATA	D.I	Active	-	-
13	SYEN	D.O	Active	-	-
14	SYDA	D.O	Active	-	-
15	SYCL	D.O	Active	-	-
16	TX_DATA	A.O	Active	-	-
17	KEY_IN	D.I	No Key	-	-
18	KEY_IN	D.I	No Key	-	-
19	KEY_IN	D.I	No Key	-	-
20	KEY_IN	D.I	No Key	-	-
21	KEY_IN	D.I	No Key	-	-
22	(NO USE)	D.O	-	-	-
23	Reference clock	D.O	Active	-	-
24	VDD	-	-	-	-
25	VSS	-	-	-	-
26	POWER_SW	A.I	No Key	-	-
27	CHARGE_DET	A.I	Charge	-	-
28	DCDCDRV	D.O	Active	-	-
29	DCDCCMR	A.I	-	-	-
30	RESET	A.I	Normal	-	-
31	VSSO	-	-	-	-
32	LOAD	A.I	-	-	-
33	XTAL	A.I	-	-	-
34	VDDPM	A.O	-	-	-

Pin	Description	I/O	Hi	Hi-z	Remarks
35	VDDLO	A.O	-	-	-
36	VDDBAT	A.I	-	-	-
37	VDDL R	-	-	-	-
38	CHARGE_START	A.O	-	-	for charge
39	VDDA	-	-	-	-
40	VSSA	-	-	-	-
41	LSRN	A.O	-	-	-
42	LSRP	A.O	-	-	-
43	BANDGAP_REF	A.O	-	-	-
44	MICS	A.O	-	-	-
45	MICP	A.I	-	-	-
46	MICN	A.I	-	-	-
47	Reference Voltage	A.O	-	-	-
48	RSSI	A.I	-	-	-
49	P0.4	D.I	-	-	-
50	AD4N	A.I	-	-	-
51	AD4P	A.I	-	-	-
52	(NO USE)	D.I	-	-	-
53	KEY_STRB	D.O	Active	-	-
54	KEY_STRB	D.O	Active	-	-
55	KEY_STRB	D.O	Active	-	-
56	LCD_SEGMENT	D.O	Active	-	-
57	LCD_SEGMENT	D.O	Active	-	-
58	LCD_SEGMENT	D.O	Active	-	-
59	KEY_STRB	D.O	Active	-	-
60	KEY_STRB	D.O	Active	-	-
61	LCD_SEGMENT	D.O	Active	-	-
62	LCD_SEGMENT	D.O	Active	-	-
63	VDD	-	-	-	-
64	VSS	-	-	-	-
65	VDD for EEPROM	D.O	-	-	-
66	I2DAT	D.I/O	Active	-	-
67	I2CLK	D.I/O	Active	-	-
68	MODE	D.I	-	-	-
69	R2	D.I	-	-	-
70	(NO USE)	D.O	-	-	-
71	VBACK/P0.7	D.I	-	-	-
72	LCD_SEGMENT	D.O	Active	-	-
73	LCD_SEGMENT	D.O	Active	-	-
74	LCD_SEGMENT	D.O	Active	-	-
75	LCD_SEGMENT	D.O	Active	-	-
76	LCD_SEGMENT	D.O	Active	-	-
77	VDDLI	-	-	-	-

Pin	Description	I/O	Hi	Hi-z	Remarks
78	LCD_SEGMENT	D.O	Active	-	-
79	LCD_SEGMENT	D.O	Active	-	-
80	LCD_SEGMENT	D.O	Active	-	-
81	LCD_SEGMENT	D.O	Active	-	-
82	LCD_SEGMENT	D.O	Active	-	-
83	LCD_SEGMENT	D.O	Active	-	-
84	LCD_SEGMENT	D.O	Active	-	-
85	VSS	-	-	-	-
86	VDD	-	-	-	-
87	LCD_SEGMENT	D.O	Active	-	-
88	(NO USE)	D.O		-	-
89	Power Select	D.O	Low Power	-	-
90	LCD_SEGMENT	D.O	Active	-	-
91	LCD_SEGMENT	D.O	Active	-	-
92	LCD_SEGMENT	D.O	Active	-	-
93	LCD_SEGMENT	D.O	Active	-	-
94	LCD_SEGMENT	D.O	Active	-	-
95	LCD_SEGMENT	D.O	Active	-	-
96	LCD_SEGMENT	D.O	Active	-	-
97	LCD_SEGMENT	D.O	Active	-	-
98	LCD_SEGMENT	D.O	Active	-	-
99	LCD_SEGMENT	D.O	Active	-	-
100	LCD_SEGMENT	D.O	Active	-	-

26. HOW TO REPLACE FLAT PACKAGE IC

26.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron

Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.

- Flux

Recommended Flux: Specific Gravity → 0.82.

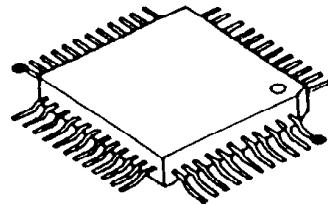
Type → RMA (lower residue, non-cleaning type)

Note: See [ABOUT LEAD FREE SOLDER \(PbF: Pb free\)](#) ().

26.2. Procedure

1. Tack the flat pack IC to the PCB by temporarily soldering two

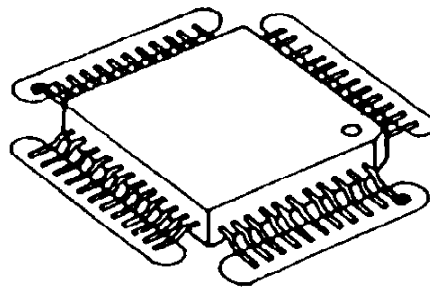
diagonally opposite pins in the correct positions on the PCB.



● - - - - - Temporary soldering point.

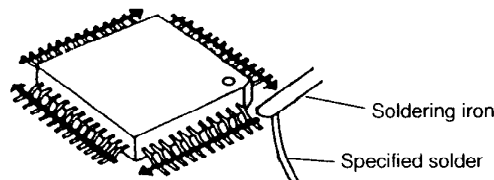
Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.



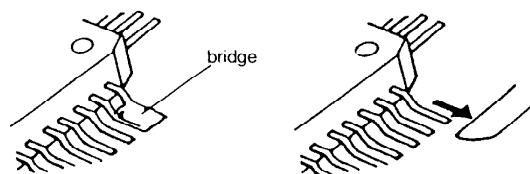
○ - - - - - Flux

3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.

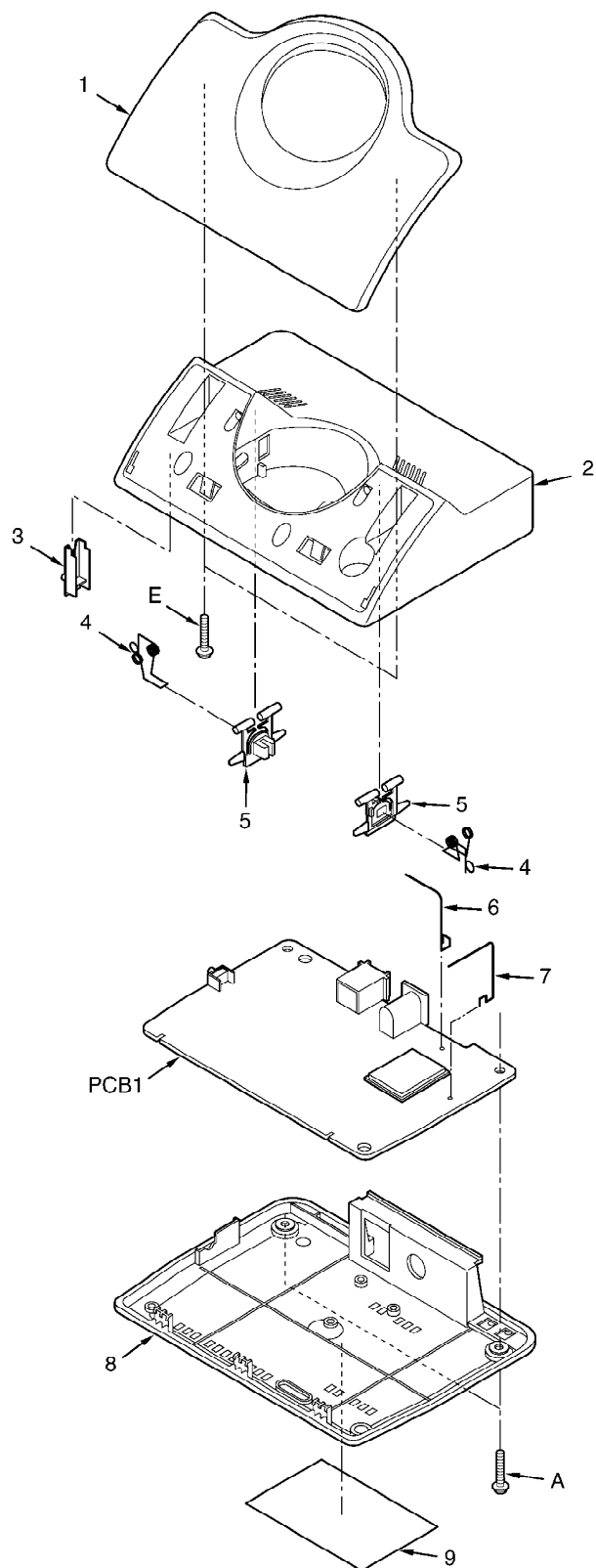


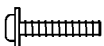

26.3. Modification Procedure of Bridge

1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.

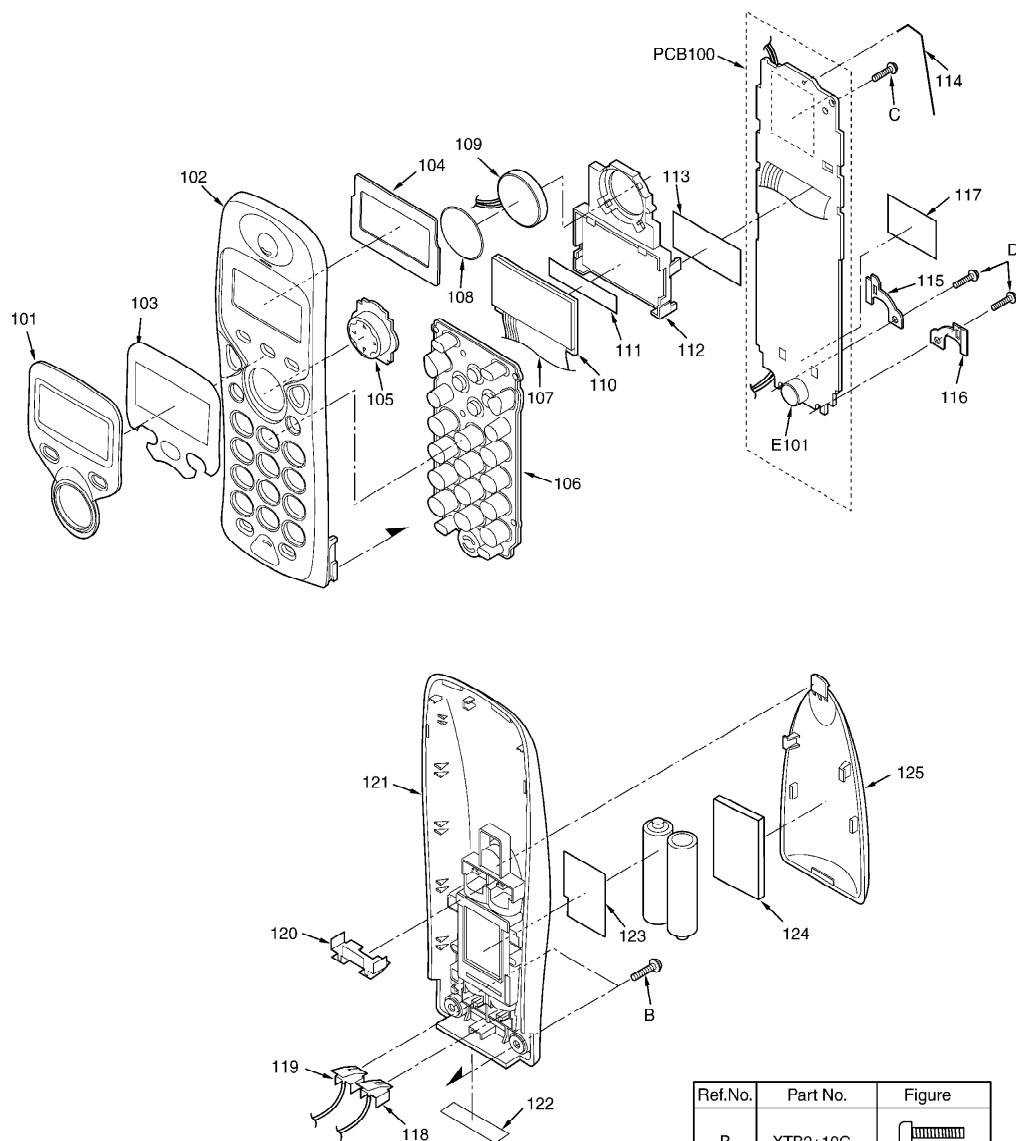





27. CABINET AND ELECTRICAL PARTS LOCATION (BASE UNIT)



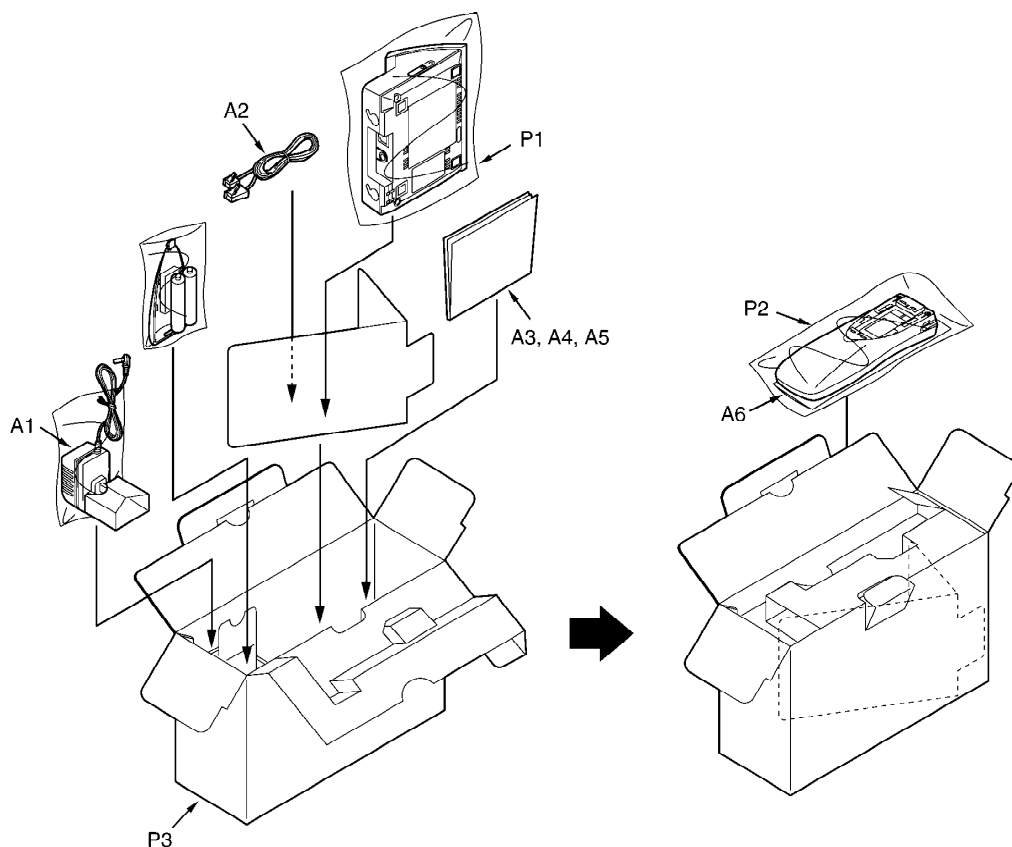
Ref.No.	Part No.	Figure
A	XTW26+12P	 2.6φ × 12mm
E	XTW26+12P	 2.6φ × 12mm

28. CABINET AND ELECTRICAL PARTS LOCATION (HANDSET)



Ref.No.	Part No.	Figure
B	XTB2+10G	 2.6 φ × 10mm
C	XTB2+8G	 2 φ × 8mm
D	XTB2+8G	 2 φ × 8mm

29. ACCESSORIES AND PACKING MATERIALS

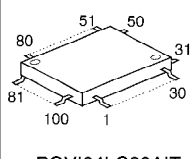
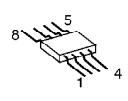
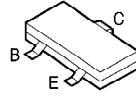
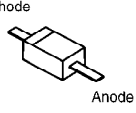
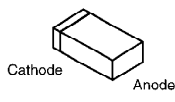


30. TERMINAL GUIDE OF THE ICs TRANSISTORS AND DIODES

30.1. Base Unit

<p>C3EBHC000006</p>	<p>C2HBAK000001</p>	<p>PQVILM1117MP</p>	<p>2SA1625</p>	<p>2SD1994A</p>
<p>B1ADGE000004, PQVTBF822T7 PQVTDTC113K</p>	<p>PQVDS1ZB60F1</p>	<p>MA1Z300</p>	<p>B0JAME000085</p>	
<p>MA2Z74800L</p>	<p>B0DDCM000001</p>	<p>LNJ308G8JRA</p>		

30.2. Handset

 <p>PQVI24LC32AIT</p>	 <p>C3EBHC000006</p>	 <p>PQVTFDN335N, B1ADGE000004 UN5216</p>	 <p>B0JCME0000035</p>
 <p>MA2Z74800L MA8390MTX</p>			

31. REPLACEMENT PARTS LIST


Note:

1. RTL (Retention Time Limited)

The marking (RTL) indicates that the Retention Time is limited for this item.

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice

Components identified by the  mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.

3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.

4. RESISTORS & CAPACITORS

Unless otherwise specified;

All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω

All capacitors are in MICRO FARADS (μ F) P= μ μ F

*Type & Wattage of Resistor

Resistor Type:

ERC:Solid	ERJ:Thick Film	PQRD:Carbon
ERD: Carbon	ERO:Metal Film	PQRQ:Fuse
ERF:Wire Wound	ERX:Metal	
ERG:Metal Oxide	PQ4R:Chip	

Wattage:

3: 1/16W	10,16,18: 1/8W	15,20,S1: 1/2W
1: 1W	2: 2W	5: 5W

Capacitor Type:

ECFD:Semi Conductor	ECCD,ECKD,ECU,PQCBP,PQVP: Ceramic
ECQS: Styrol	ECQM,ECQV,ECQE,ECQU,ECQB: Polyester
PQCBX,ECUV:Chip	ECEA,ECSZ,ECOS,PSCE: Electrolytic
ECMS:Mica	ECQP: Polypropylene

Voltage:

ECQ type	ECQG, ECQV type	ECSZ type	Others	
1H: 50V	05: 50V	0F: 3.15V	0J: 6.3V	1V: 35V
2A: 100V	1: 100V	0J: 6.3V	1A: 10V	50,1H: 50V
2E: 250V	2: 200V	1A: 10V	1C: 16V	1J: 63V
2H: 500V		1V: 35V	1E,25: 25V	2A: 100V

31.1. Base Unit

31.1.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQGG10154W4	GRILLE	ABS-HB
2	PQKM10586Z3	CABINET BODY	ABS-HB
3	PQHR10962Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB
4	PQJT10203Z	TERMINAL	
5	PQKE10356Z1	GUIDE, CHARGE TERMINAL CASE	POM-HB
6	PQSA10131Z	ANTENNA, MAIN	
7	PQSA10132Z	ANTENNA, SUB	
8	PQYF10560Z3	CABINET COVER	PS-HB
9	PQGT15504Z	NAME PLATE	

31.1.2. Main P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP1D410EH	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICS)	
IC1	C3EBHC000006	IC	
IC2	C2HBAK000001	IC	
IC3	J3FKK0000003	IC	
Q9	PQVILM1117MP	IC	S
		(TRANSISTORS)	
Q2	2SA1625	TRANSISTOR(SI)	S
Q3	PQVTBF822T7	TRANSISTOR(SI)	
Q6	2SD1994A	TRANSISTOR(SI)	
Q8	B1ADGE000004	TRANSISTOR(SI)	
Q10	PQVTDTC143K	TRANSISTOR(SI)	
		(DIODES)	
D2	PQVDS1ZB60F1	DIODE(SI)	S
D3	MA1Z300	DIODE(SI)	
D4	B0JAME000085	DIODE(SI)	
D5	MA2Z74800L	DIODE(SI)	
DA1	B0DDCM000001	DIODE(SI)	
LED1	LNJ308G8JRA	LED	
		(COILS)	
L1	PQLQR4D4R7K	COIL	
L3	PQLQR2M33NK	COIL	
		(JACKS)	
J1	PQJJ1TB26Z	JACK, MODULATOR	S
J2	K2EZ2B000040	JACK, DC	
		(RESISTORS)	
R1	ERJ3GEYJ155	1.5M	
R2	ERJ3GEYJ155	1.5M	
R3	ERJ3GEYJ224	220K	
R4	ERJ3GEYJ184	180K	
R5	ERJ3GEYJ224	220K	
R6	ERJ3GEYJ184	180K	
R7	ERJ3GEYJ104	100K	
R8	ERJ3GEYJ272	2.7K	
R9	ERJ3GEYJ103	10K	
R10	ERJ3GEYJ222	2.2K	
R12	PQ4R18XJ000	0	S
R16	ERJ3GEYJ133	13K	
R18	ERJ3GEYJ392	3.9K	
R19	ERJ12YJ220	22	
R20	ERJ12YJ560	56	
R21	ERJ3GEYJ104	100K	
R22	ERJ3GEYJ333	33K	
R23	ERJ3GEYJ560	56	
R25	ERJ3GEYJ391	390	
R28	ERJ3GEYJ751	750	
R29	ERJ3GEYJ101	100	
R30	ERJ3GEYJ101	100	
R31	ERJ3GEYJ101	100	
R32	ERJ3GEYJ560	56	
R36	ERJ3GEY0R00	0	
R38	ERJ3GEYJ330	33	
R41	ERJ3GEYJ101	100	
R42	ERJ3GEYJ221	220	

Ref. No.	Part No.	Part Name & Description	Remarks
R43	ERJ1WYJ330	33	
R44	ERJ1WYJ330	33	
R52	ERJ3GEY0R00	0	
R53	ERJ3GEYJ565	5.6M	
R54	ERJ3GEYJ184	180K	
R57	ERJ3GEYJ103	10K	
R58	ERJ3GEYJ103	10K	
R66	ERJ3GEYJ390	39	
R67	ERJ3GEYJ390	39	
R68	ERJ3GEYJ151	150	
R77	PQ4R10XJ000	0	S
R78	ERJ3GEYJ181	180	
R79	ERJ3GEYJ181	180	
R81	ERJ3GEYJ565	5.6M	
R82	ERJ3GEYJ184	180K	
R86	ERJ3GEY0R00	0	
R87	ERJ3GEY0R00	0	
R88	ERJ3GEY0R00	0	
C80	PQ4R10XJ000	0	S
C86	ERJ3GEY0R00	0	
		(CAPACITORS)	
C1	ECKD2H681KB	680P	S
C2	ECKD2H681KB	680P	S
C3	ECQE2223KF	0.022	
C4	ECQE2223KF	0.022	
C11	ECUV1H472KBV	0.0047	
C12	PQCUV1C474KB	0.47	
C13	PQCUV1A105KB	1	
C14	PQCUV1C224KB	0.22	
C15	ECEA1HKS100	10	S
C16	PQCUV1H154KR	0.15	
C18	ECUV1H100DCV	10P	
C19	ECUV1H100DCV	10P	
C20	ECUV1C104KBV	0.1	
C21	ECUV1H100DCV	10P	
C22	PQCUV1C224KB	0.22	
C23	ECUV1C104KBV	0.1	
C24	ECUV1C104KBV	0.1	
C25	ECEA1CKS100	10	S
C26	ECUV1C104KBV	0.1	
C27	ECUV1C104KBV	0.1	
C28	ECUV1C683KBV	0.068	
C29	ECUV1C683KBV	0.068	
C30	ECUV1H182KBV	0.0018	
C32	ECUV1H270JCV	27P	
C33	ECUV1H1R0CCV	1	
C34	ECUV1C104KBV	0.1	
C35	ECUV1H333KBV	0.033	S
C36	ECUV1C104KBV	0.1	
C37	ECUV1C104KBV	0.1	
C38	ECUV1C104KBV	0.1	
C40	ECEA1AKA101	100	
C41	ECEA0JKA101	100	
C43	ECUV1H100DCV	10P	

Ref. No.	Part No.	Part Name & Description	Remarks
C48	ECUV1H330JCV	33P	
C49	ECUV1H103KBV	0.01	
C50	ECUV1H100DCV	10P	
C54	ECUV1H060DCV	6P	S
C55	ECUV1H100DCV	10P	
C56	ECUV1H100DCV	10P	
C57	ECUV1H030CCV	3P	
C58	ECUV1H2R0CCV	2	
C66	ECUV1H2R0CCV	2	
C67	ECUV1A475KB	4.7	
C69	ECUV1H2R0CCV	2	
C72	ECUV1H2R0CCV	2	
C73	ECUV1H100DCV	10P	
C74	ECUV1H103KBV	0.01	
C75	PQCUV1H020CC	2P	
C76	ECUV1H060DCV	6P	S
C78	ECUV1H100DCV	10P	
		(OTHERS)	
S1	K0H1BB000018	SPECIAL SWITCH, TACTILE	
SA1	PQVDDSS301L	VARISTOR (SURGE ABSORBER)	S
X1	H0D103500003	CRYSTAL OSCILLATOR	

31.2. Handset

31.2.1. Cabinet and Electrical Parts


Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGP10225Y3	PANEL, LCD	AS-HB
102	PQKM10587W4	CABINET BODY	ABS-HB
103	PQHS10553Z	TAPE, DOUBLE SIDE	
104	PQHS10554Z	SPACER, LCD	
105	PQBC10375Z1	PUSH BUTTON, NAVI	ABS-HB
106	PQSX10224Q	KEYBOARD SWITCH, 20KEY	
107	PQJE10129Z	LEAD WIRE, HEATSEAL	
108	PQHS10467Z	COVER, SP NET	
109	L0AD02A00016	SPEAKER	
110	L5ACADC00009	LIQUID CRYSTAL DISPLAY	
111	PQHS10594Z	TAPE, DOUBLE SIDE	
112	PQHR10963Z	GUIDE, LCD	ABS-HB
113	PQHS10486Z	HEAT SHIELD PARTS, TAPE	
114	PQSA10133Z	ANTENNA	
115	PQJT10204Z	TERMINAL (L)	
116	PQJT10205Z	TERMINAL (R)	
117	PQHX11202Z	INSULATOR	
118	PQJC10058Z	BATTERY TERMINAL (-)	
119	PQJC10057Z	BATTERY TERMINAL (+)	
120	PQJC10056Z	BATTERY TERMINAL	
121	PQKF10582Z4	CABINET COVER	ABS-HB
122	PQGT15507Z	NAME PLATE	
123	PQHX11174Z	PLASTIC PARTS, BATTERY COVER SHEET	
124	PQHS10561Y	SPACER, BATTERY COVER	
125	PQKK10134Z4	BATTERY	ABS-HB

31.2.2. Main P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWP1D410ER	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICs)	
IC1	PQVI24LC32AI	IC	
IC2	C3EBHC000006	IC	
IC3	J3FKK0000003	IC	
		(TRANSISTORS)	
Q1	PQVTFDN335N	TRANSISTOR(SI)	S
Q2	B1ADGE000004	TRANSISTOR(SI)	
Q3	UN5216	TRANSISTOR(SI)	
		(DIODES)	
D1	B0JCME000035	DIODE(SI)	
D3	MA2Z74800L	DIODE(SI)	
D4	MA8390MTX	DIODE(SI)	
D6	MA2Z74800L	DIODE(SI)	
D7	MA2Z74800L	DIODE(SI)	
		(COILS)	
L2	G1A470L00001	COIL	
L3	PQLQR4D4R7K	COIL	
L4	G1C100MA0072	COIL	
L5	G1C100MA0072	COIL	
F1	PQLQR2M5N6K	COIL	S
		(RESISTORS)	
R1	ERJ3GEYJ222	2.2K	
R2	ERJ8BQJR30	0.3	
R3	ERJ3GEYJ560	56	
R4	ERJ3GEYJ103	10K	
R5	ERJ3GEYJ331	330	
R6	ERJ3GEYJ332	3.3K	
R7	ERJ3GEYJ331	330	
R8	ERJ3GEYJ331	330	
R11	ERJ3GEY0R00	0	
R17	ERJ3GEY0R00	0	
R18	ERJ3GEYJ330	33	
R19	ERJ3GEYJ153	15K	
R20	ERJ3GEY0R00	0	
R21	ERJ6RSJR10V	0.1	
R22	ERJ3GEY0R00	0	
R23	ERJ3GEYJ2R2	2.2	
R24	ERJ3GEY0R00	0	
		(CAPACITORS)	
C2	ECUV1A475KB	4.7	
C3	ECUV1C104KBV	0.1	
C4	ECUV1C104KBV	0.1	
C5	ECST0JY475	4.7	
C6	ECUV1H100DCV	10P	
C7	ECUV1C104KBV	0.1	
C8	ECUV1H100DCV	10P	
C10	ECUV1H100DCV	10P	
C11	ECUV1H100DCV	10P	
C12	ECUV1H100DCV	10P	

Ref. No.	Part No.	Part Name & Description	Remarks
C14	EEE1AA221P	220	
C15	EEE1AA221P	220	
C16	ECUV1H1R0CCV	1	
C17	ECUV1H180JCV	18P	
C18	ECUV1C104KBV	0.1	
C20	ECUV1C104KBV	0.1	
C21	ECUV1C104KBV	0.1	
C22	ECUV1C104KBV	0.1	
C23	ECUV1C104KBV	0.1	
C24	ECUV1C104KBV	0.1	
C26	ECUV1C104KBV	0.1	
C27	ECUV1C104KBV	0.1	
C28	ECUV1C104KBV	0.1	
C29	ECUV1C104KBV	0.1	
C30	ECUV1C104KBV	0.1	
C31	ECUV1H100DCV	10P	
C33	ECUV1A225KB	2.2	
C54	ECUV1H100DCV	10P	
C55	ECUV1H020CCV	2P	
C56	ECUV1H020CCV	2P	
C57	ECUV1H330JCV	33P	
C60	ECUV1A475KB	4.7	
C62	ECUV1A105KBV	1	
C63	ECUV1H100DCV	10P	
C64	ECUV1A105KBV	1	
C65	ECUV1H020CCV	2P	
C66	ECUV1H020CCV	2P	
		(OTHERS)	
E101	LOCBAB000052	MICROPHONE	
X1	H0D103500002	CRYSTAL OSCILLATOR	

31.3. Accessories and Packing Materials

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV19EZ	AC ADAPTOR	
A2	PQJA87S	CORD, TELEPHONE	
A3	PQQX13445Z	INSTRUCTION BOOK	
A4	PQQW12712Z	QUICK GUIDE	
A5	QUQW00048Z	LEAFLET	
A6	PQQW12846Y	LEAFLET, RECHARGE	
P1	PQPP10100Z	PROTECTION COVER (for Base Unit)	
P2	PQPP10084Z	PROTECTION COVER (for Handset)	
P3	PQPK13941Z	GIFT BOX	

31.4. Fixtures and Tools

Part No.	Part Name & Description	Remarks
PQZZTCD705BX	I2C PCB	
PQZZ1CD705BX	RS232C CABLE	
PQZZ2CD705BX	CLIP CABLE	
PQZZ3CD705BX	DC CABLE	
PQZZTCD410E	BATCH FILE	

Note:

See [CHECK PROCEDURE \(BASE UNIT\)](#) (), and [CHECK PROCEDURE \(HANDSET\)](#) ().

32. EEPROM LAYOUT (BASE UNIT)

32.1. Scope

The purpose of this section is to describe the layout of the EEPROM (IC1) for the KX-TCD410 Base Unit.

The EEPROM contains hardware, software, and user specific parameters. Some parameters are set during production of the base e.g. crystal frequency adjustment at address 0000 and 0001, some are set by the user configuration e.g. ringer volume at address 0220, and some are set during normal use of the phone e.g. meter pulse billing at address 0140..015F.

32.2. Introduction

The base unit uses a 128K bit (128 x 8) serial EEPROM (IC9) for storing volatile parameters. All parameters are set up before the base leaves the factory. Some of these are vital for the operation of the hardware so a set of default parameters is programmed before the actual hardware fine-tuning can be initiated. This document lists all default settings with a short description.

In the tables below values in a range that are similar are not repeated; i.e. Address 00 to 01 contains the value 00 simply means that the value 00 is repeated in all addresses in the range. All values in this document are in hexadecimal notation.

Type	Name	Description
D	default	The EEPROM location is preset to the Default value by the eeprom default
A	adjust	The EEPROM location is set during the production test and should not be overwritten. The value is set by the eeprom default loader only if the locati contains all 1's (byte: 0xFF, word FFFFh), i, e. it has never been set.
-		EEPROM location which is not set at all.
d	default	Same as D but best-guess value and/or not verified.

Country Setting	x	Default - no specific country setting, so revert to default value
-----------------	---	---

32.3. EEPROM Layout

32.3.1. General Setup

Address	Default	Name	Country Setting	Type	Description
0000-01	00 E0	EepromOscillator	x	A	Frequency adjustment
0002	20	ModulationDeviation	x	A	Modulation adjustment
0020	-	RFPI (ID for Base Unit)	x	A	RFPI
0025	00 00	AC (Base PIN code)	x	D	AC code
0028	00	TBR22Test	x	-	TBR22 test
0030-0034	FF .. FF	IPUI_1	x	D	Ipui for handset 1. If set to FF . handset is not enrolled.
0035-0039	FF .. FF	IPUI_2	x	D	Ipui for handset 2. If set to FF . handset is not enrolled.
003A-003E	FF .. FF	IPUI_3	x	D	Ipui for handset 3. If set to FF . handset is not enrolled.
003F-0043	FF .. FF	IPUI_4	x	D	Ipui for handset 4. If set to FF . handset is not enrolled.
0044-0048	FF .. FF	IPUI_5	x	D	Ipui for handset 5. If set to FF . handset is not enrolled.
0049-004D	FF .. FF	IPUI_6	x	D	Ipui for handset 6. If set to FF . handset is not enrolled.
004E-008F	-	Reserved	x	-	Protocol data
0090-009F	-	UAK_1	x	-	UAK for handset 1
00A0-00AF	-	UAK_2	x	-	UAK for handset 2
00B0-00BF	-	UAK_3	x	-	UAK for handset 3
00C0-00CF	-	UAK_4	x	-	UAK for handset 4
00D0-00DF	-	UAK_5	x	-	UAK for handset 5
00E0-00EF	-	UAK_6	x	-	UAK for handset 6

32.3.2. Switch Control

Address	Default	Name	Country Setting	Type	Description
09F1	00	HsRegInfo.RegFlags	x	D	Handset registration info - registration Bit 6..7: not used 0..5: handset 1..6 info, 1=reg, 0=not reg
09F2	00	HsRegInfo.EmcFlags	x	D	Handset registration info - EMC flags Bit 6..7: not used 0..5: handset 1..6 info, 1=known, 0=unknown
09F3	21	RingMode	x	D	Ring mode. Modes used in KAMM. 20h and 21h. Bit 7..5: Mode (001=group) 4 : Not used 3..0: Id (001= id of first group)

32.3.3. Clip configuration

Address	Default	Name	Country Setting	Type	Description
0F1C	70	Detect	72	D	CLIP detect configuration Bit 0-2: Mode: 0: Learn mode, 1: only, 3: Generic mod, 4: Russia only 3: Unused4 4: Onhook: 1=enable 0=disabled 5: Offhook: 1=enable 0=disabled 6: Msgwaiting: 1=enable 0=disabled 7: Unused7

Address	Default	Name	Country Setting	Type	Description
0F37..38	3D 01	Parse.Configuration	3D 00	D	<p>Clip parse set configuration Bit</p> <p>0: Etsi: 1=enable 0=disable 1: ForwardNumber: 1=enable</p> <p>2: Danish: 1=enable 0=disable 3: Dutch: 1=enable 0=disable 4: Canadian: 1=enable 0=disable 5: Swedish: 1=enable 0=disable 6: UserDefined: 1=enable 0=disable 7: KPN vmwi: 1=enable 0=disable 8: ProtocolPriority: If 2 mutual exclusive parameter occurs, the 1st in the protocol message has priority. 9: UseCallType: Verify the Call Type parameter available, when receiving Call CLIP at busy subscriber. 1=enable 0=disable</p> <p>10..15: Reserved10..Reserved</p>
0F3D	00	Rcid.Mode	x	D	<p>RCID mode Bit</p> <p>0: answer-mode, 1=auto-answer, 0=manual answer 1..4: 0 5: detect length, 1=enable(development only), 6: add category, 1=enable(development only), 7: 0</p>
0F3E	70	Rcid.Options	x	D	<p>RCID mode Bit</p> <p>1..3: 0 4: pre-detect before first RCID 1=enable, 0=disable 5: emulate ring-back tone, 1=enable, 0=disable 6: detect ring-timing, 1=enable, 0=disable 7: 0</p>

Address	Default	Name	Country Setting	Type	Description
0F3F	73	Rcid.PacketLen_RetryCnt	x	D	RCID mode packet length and retry count Bit 7..4: Packet length including begin+category (default 9) 3..0: Request-Retry Count (de
0F40	01	Rcid.RingCntToStart	x	D	RCID, number of ring's before answering call 0: on first ring-volt-off 1..9: on 1-9 ring pattern-off
0F41	04	Rcid.LineSeizureT0	x	D	RCID line-seizure delay Unit: 50ms, defaults to 200ms
0F42	00	Rcid.ReqDelayT1	x	D	RCID-request delay parameter Delay from line-seizure to 1. Req-tone: T0+T1 (200ms) Delay between two req-tones : T1+T3max (600ms) Dealy between data and next T1+T7T8 (150ms) Unit: 1ms, defaults to 0ms
0F43	0E	Rcid.ReqWidthT2	x	D	RCID-request width (T2) Unit: 10ms, defaults to 140ms
0F44	04	Rcid.ReqTimeoutT3Max	x	D	RCID-request to "first RCID d timeout (T3Max) Unit: 50ms, defaults to 600ms
0F45	04	Rcid.DataTimeoutT7T8Max	x	D	RCID next-digit timeout (T7+T8) Unit: 50ms, defaults to 150ms
0F46	02	Rcid.SimRingCnt	x	D	RCID simulated-ring count
0F47	38	Rcid.SimRingOnOffTime	x	D	RCID simulated-ring timing Bit 0..3: ring-on time 4..7: ring-off time Unit: 50ms, defaults to 1.5s ri time, 4s ring-off time
0F48	01	Rcid.MaxErrCnt	x	D	RCID, max error-count during

32.3.4. BsUiTask settings

Address	Default	Name	Country Setting	Type	Description
0F4B	RFPI_1	Config1	21	D	BsUiTask configuration (MSB) Bits 1=enable 0=disable 0: AmPmClockSettingEnabled, 1: ClipDetectionSettingEnabled 2: AkzMenuEnabled, disabled 3: HakzMenuEnabled, disabled 4: RussianClipSttingEnabled, d 5: SmscSendNumberSettingEn disabled 6-7: Unused
0F4C	F7	Config2	02	D	BsUiTask configuration (LSB) Bits 1=enable 0=disable 0: FlashTime1Enabled, enabled 1: FlashTime2Enabled, enabled 2: FlashTime3Enabled, enabled 3: KeyClicksEnable, enabled 4: ARSCarrierMenuEnabled, en 5: ARSIntDeletionMenuEnablec 6: ARSMultipleCarrierMenuEna enabled 7: ARSMultipleAreaCodeMenuE enabled
0F4D	00	UserData.SmsPabxSupport	-	-	SMS PABX Support On/Off

33. EEPROM LAYOUT (HANDSET)

33.1. Scope

The purpose of this section is to describe “layout of the EEPROM (IC2) KX-A141 Handset”. The EEPROM contains hardware, software, and user specific parameters. Some parameters are set during production of the handset e.g. crystal oscillator adjustment at 0000..01, some are set by the user when configuring the handset e.g. ringer volume at 0F38, and some during normal use of the phone e.g. redial memory at 0311..0392.

33.2. Introduction

The handset uses a 32k bit serial EEPROM (IC2) for storing volatile parameters. All parameters are set up before the handset the factory. Some of these are vital for the operation of the hardware so a set of default parameters is programmed before the actual hardware fine-tuning can be initiated. This document lists all default settings with a short description.

This document lists all default parameters with a short description.

In the tables below values in a range that are similar are not repeated; i.e. Address 00 to 01 contains the value 00 simply means that the value 00 is repeated in all addressee in the range.

Type	Name	Description
D	default	The EEPROM location is preset to the Default value by the eeprom default loader.
A	adjust	The EEPROM location is set during the production test and should not be overwritten. The value is set by the eeprom default loader only if the location contains 0xFF, i.e. it has never been set.
-		EEPROM location which is not set at all.

33.3. EEPROM contents

33.3.1. General Setup

Address	Default	Name	Type	Description
0000-0001	00	EepromOscillator	D	Frequency adjustment
0002	20	ModulationDeviation	D	Modulation adjustment
0030-0034	00	IPEI (ID for Handset)	D	IEPI
0036-003A	FF	PARK_1	-	PARK for registration 1
003B-003F	FF	PARK_2	-	PARK for registration 2
0040-0044	FF	PARK_3	-	PARK for registration 3
0045-0049	FF	PARK_4	-	PARK for registration 4
004A-004D	FF	PLI_1-PLI_4	D	PLI for registration 1-4. If set to FF registration is deleted.

33.3.2. Signal detection

Address	Default	Name	Country Setting	Type	Description
0100-0104	-	RFPI_1	-	-	RFPI for registration 1
0105	-	SerClass_1	-	-	Service class for registration 1
0106	-	LAL_1	-	-	Location area level for registration 1
0107	-	IPUI_LEN_1	-	-	IPUI length for registration 1
0108-0114	-	IPUI_1	-	-	IPUI for registration 1
0115	-	ZAP_1	-	-	ZAP for registration 1
0116	-	STATUS_1	-	-	Status for registration 1
0117-126	-	UAK_1	-	-	UAK for registration 1
0130-134	-	RFPI_2	-	-	RFPI for registration 2
0135	-	SerClass_2	-	-	Service class for registration 2
0136	-	LAL_2	-	-	Location area level for registration 2
0137	-	IPUI_LEN_2	-	-	IPUI length for registration 2
0138-0144	-	IPUI_2	-	-	IPUI for registration 2
0145	-	ZAP_2	-	-	ZAP for registration 2
0146	-	STATUS_2	-	-	Status for registration 2

Address	Default	Name	Country Setting	Type	Description
0147-0156	-	UAK_2	-	-	UAK for registration 2
0160-0164	-	RFPI_3	-	-	RFPI for registration 3
0165	-	SerClass_3	-	-	Service class for registration 3
0166	-	LAL_3	-	-	Location area level for registration 3
0167	-	IPUI_LEN_3	-	-	IPUI length for registration 3
0168-0174	-	IPUI_3	-	-	IPUI for registration 3
0175	-	ZAP_3	-	-	ZAP for registration 3
0176	-	STATUS_3	-	-	status for registration 3
0177-0186	-	UAK_3	-	-	UAK for registration 3
0190-0194	-	RFPI_4	-	-	RFPI for registration 4
0195	-	SerClass_4	-	-	Service class for registration 4
0196	-	LAL_4	-	-	Location area level for registration 4
0197	-	IPUI_LEN_4	-	-	IPUI length for registration 4
0198-01A4	-	IPUI_4	-	-	IPUI for registration 4
01A5	-	ZAP_4	-	-	ZAP for registration 4
01A6	-	STATUS_4	-	-	UAK for registration 4
01A7-01B6	-	UAK_4	-	-	UAK for registration 4
0450-0451	-	HSPinCode	-	-	4 BCD Digits
0462	00	Language	-	D	00 = English 01 = Spanish 02 = French 03 = Italian 04 = Dutch 05 = Turkish 06 = Hungarian 07 = Portuguese 08 = Polish 09 = Command 0A = German
0467	00	FactoryLanguageSetting	-	D	Factory setting for language: 00 = English 01 = Spanish 02 = French 03 = Italian 04 = Dutch 05 = Turkish 06 = Hungarian 07 = Portuguese 08 = Polish 09 = Command 0A = German

33.3.3. Battery Parameters

Address	Default	Name	Type	Description
0F04	9A	LowVoltage	A	Voltage on which to start battery low indication. The voltage has to be measured u value for 8 seconds before the handset start signaling low battery. LowVoltage[eprom]=[ADC-steps] LowVoltage[mV](14.35[mV/step])

33.3.4. Default Audio-Parameters

Address	Default	Name	Type	Description
0F37	5F	GR-offset for vulomestep 2	A	Bit7: AOG Bit6: AOG2 Bit5: ? bit0: Gain-receive (values ranging from 0x00 to 0x30 step representing 1 dB)

33.3.5. VolumeSetting Second Block

Address	Default	Name	Type	Description
0F53	FF	MenuConfig	D	bit 0 - Registration menu on/off 1/0 bit 1 - Select base menu on/off 1/0 bit 2 - Internal ringer menu on/off 1/0 bit 3 - Page ringer menu on/off 1/0 bit 4 - Standby mode menu on/off 1/0 bit 5 - Battery select menu on/off 1/0 bit 6 - Call waiting menu on/off 1/0 bit 7 - Clip list on/off 1/0

34. SCHEMATIC DIAGRAM (BASE UNIT)

35. SCHEMATIC DIAGRAM (HANDSET)

36. CIRCUIT BOARD (BASE UNIT)

36.1. Component View

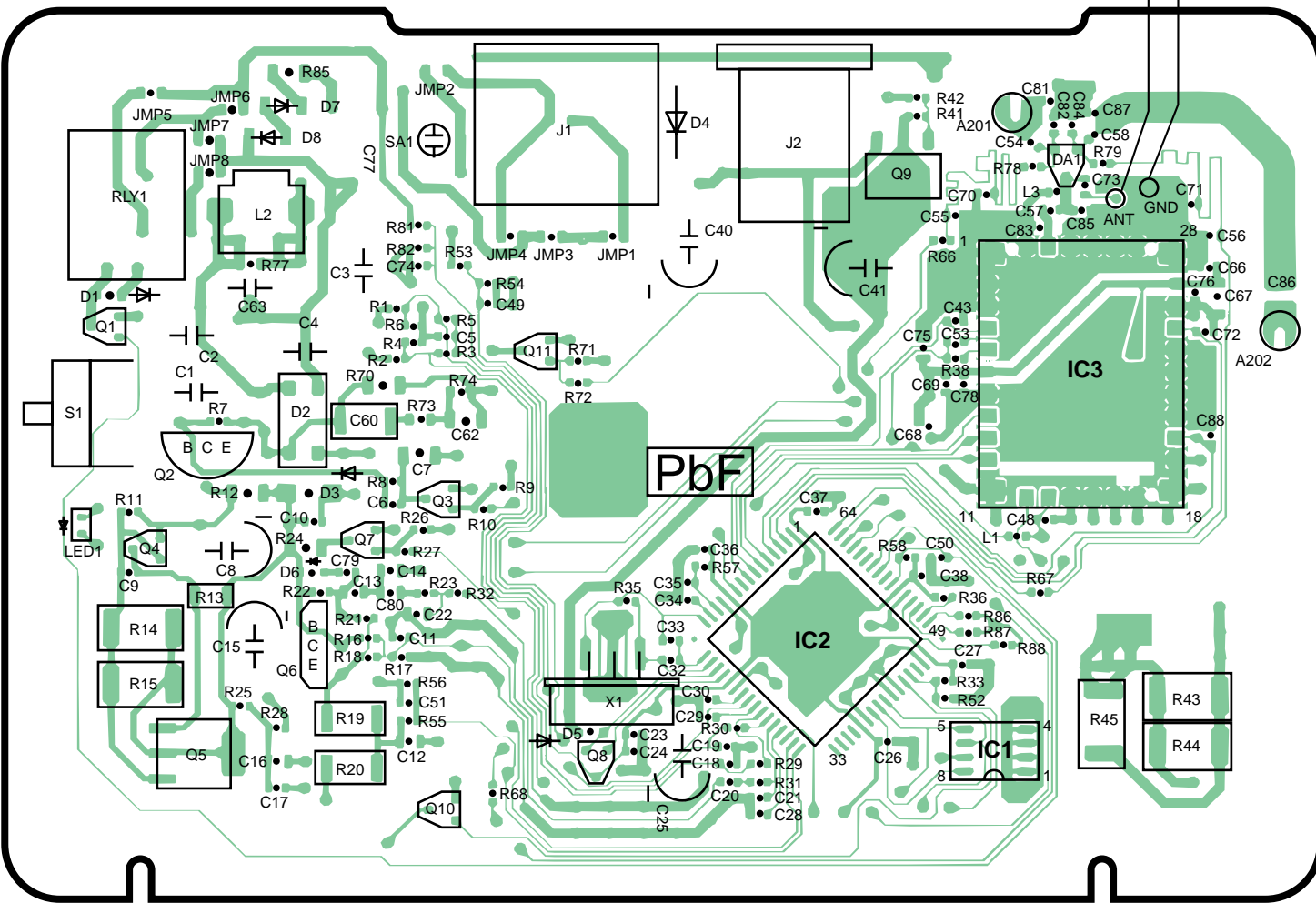
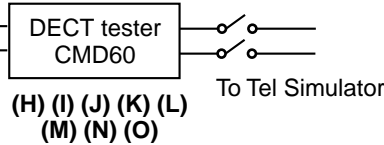
36.2. Flow Solder Side View

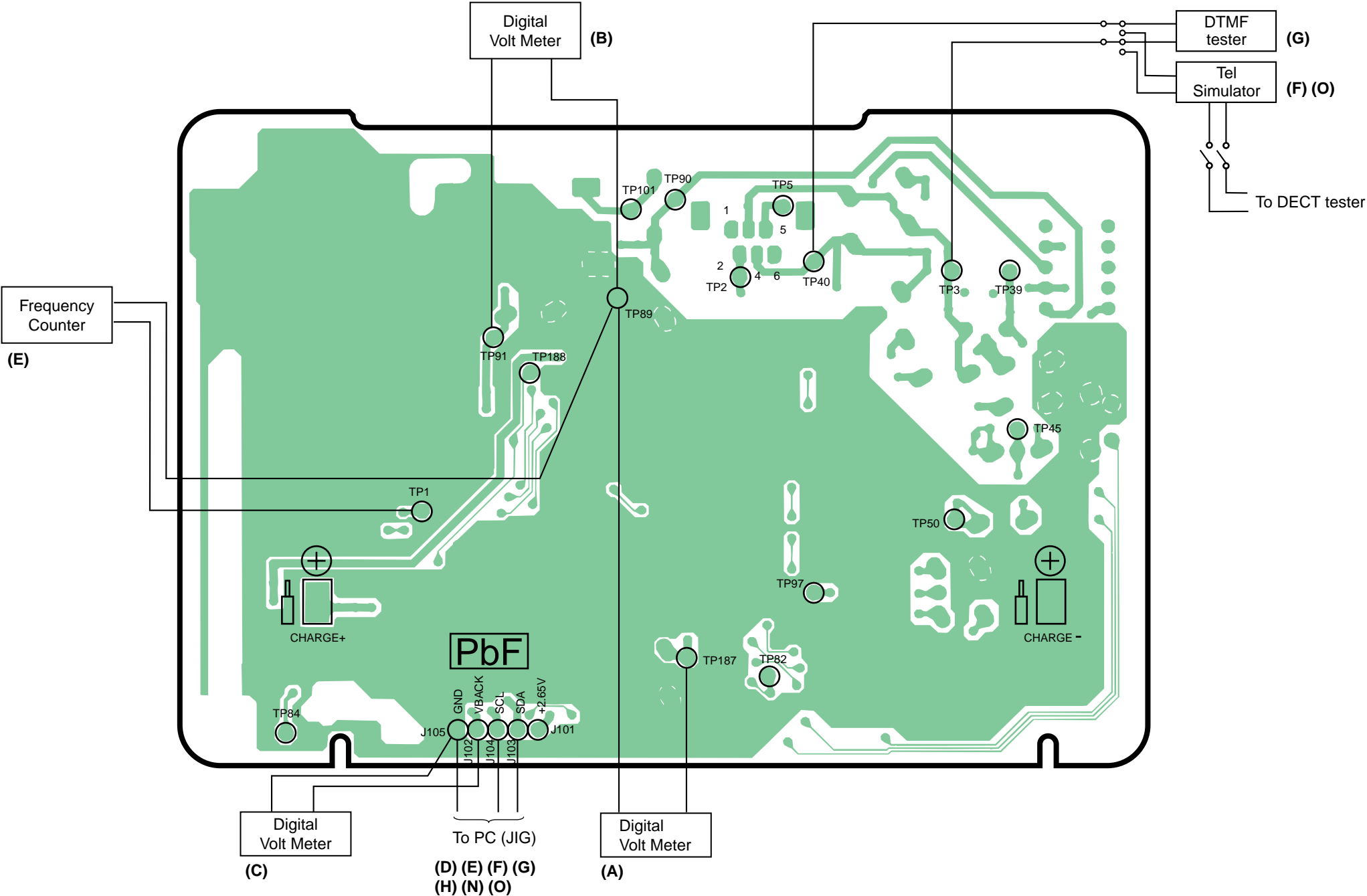
37. CIRCUIT BOARD (HANDSET)

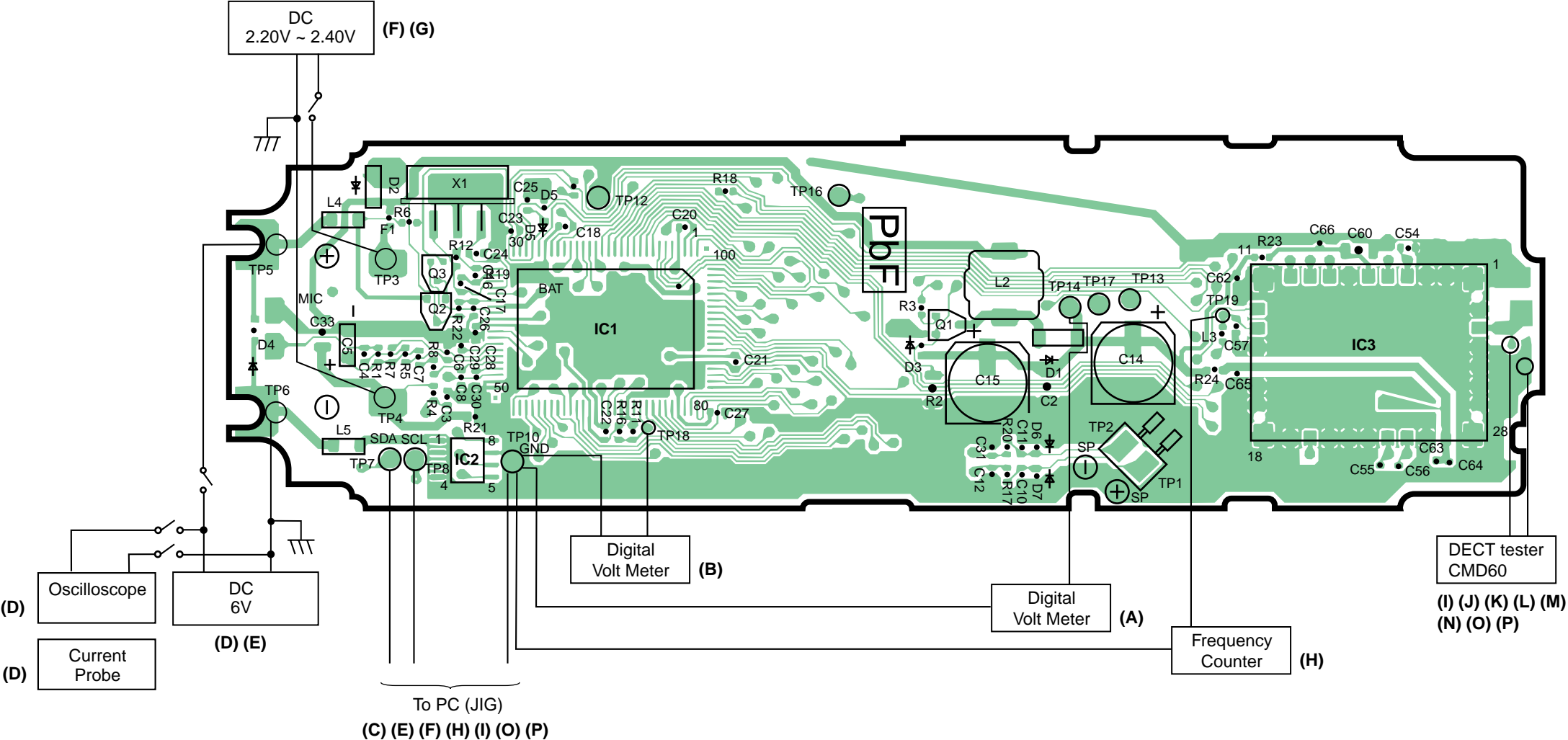
37.1. Component View

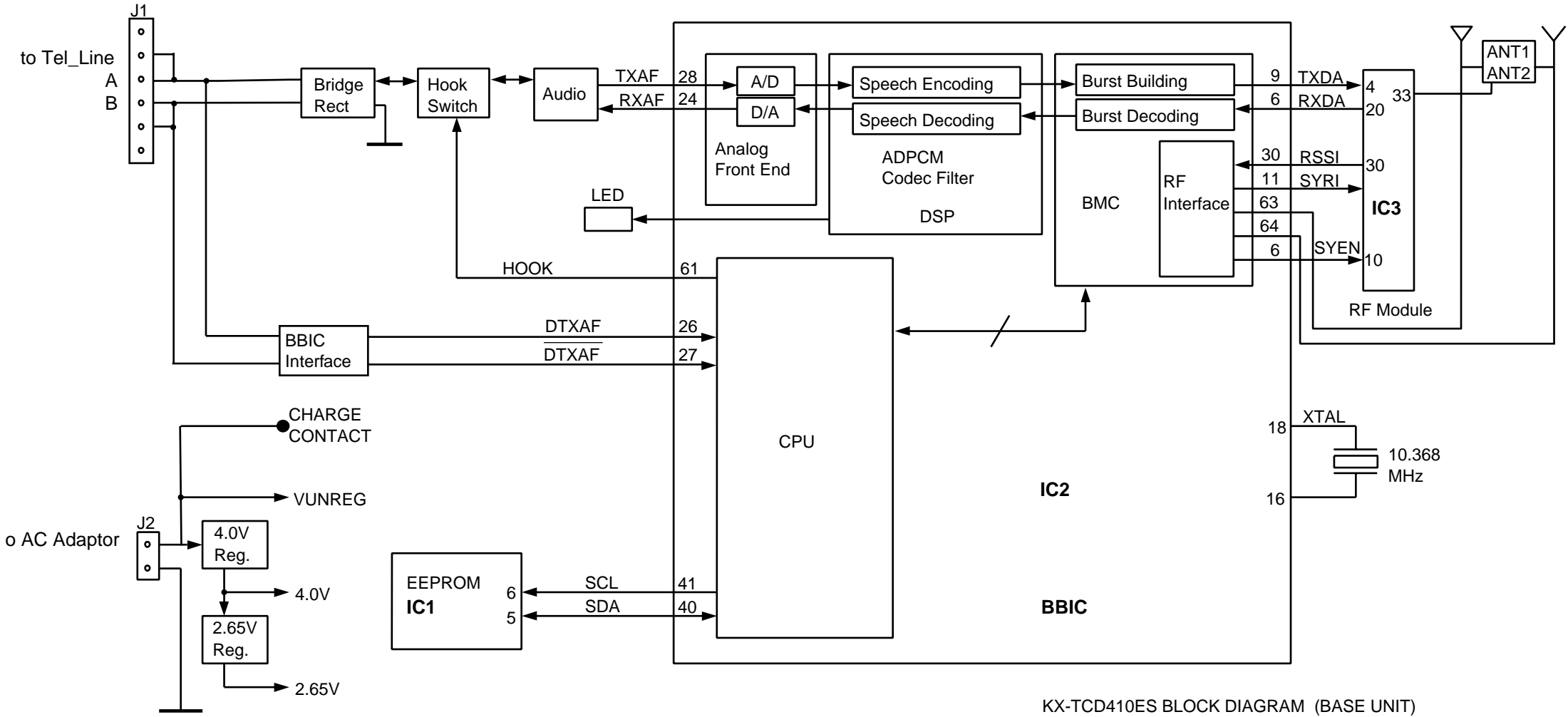
37.2. Flow Solder Side View

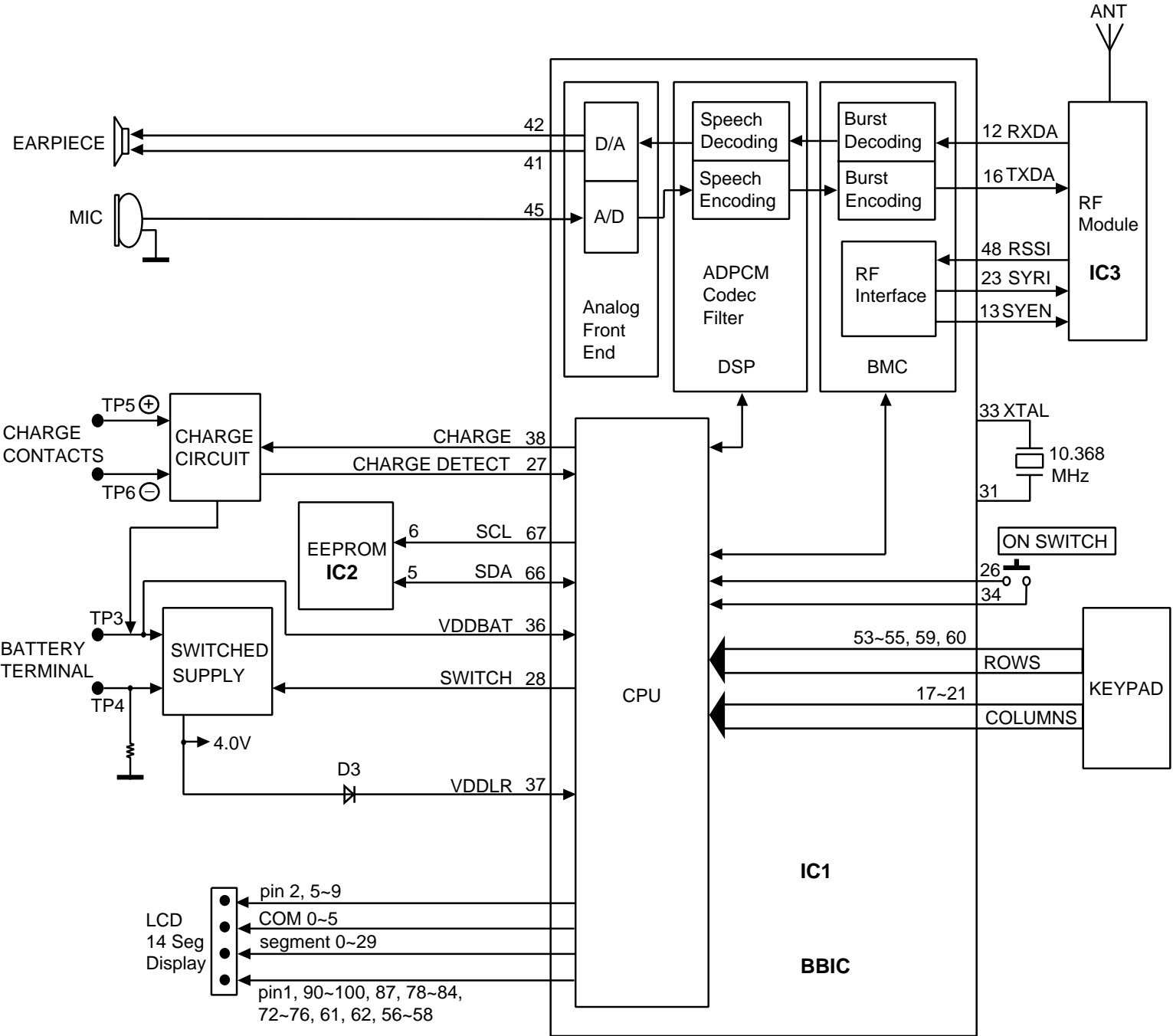
M / KXTCD410ES



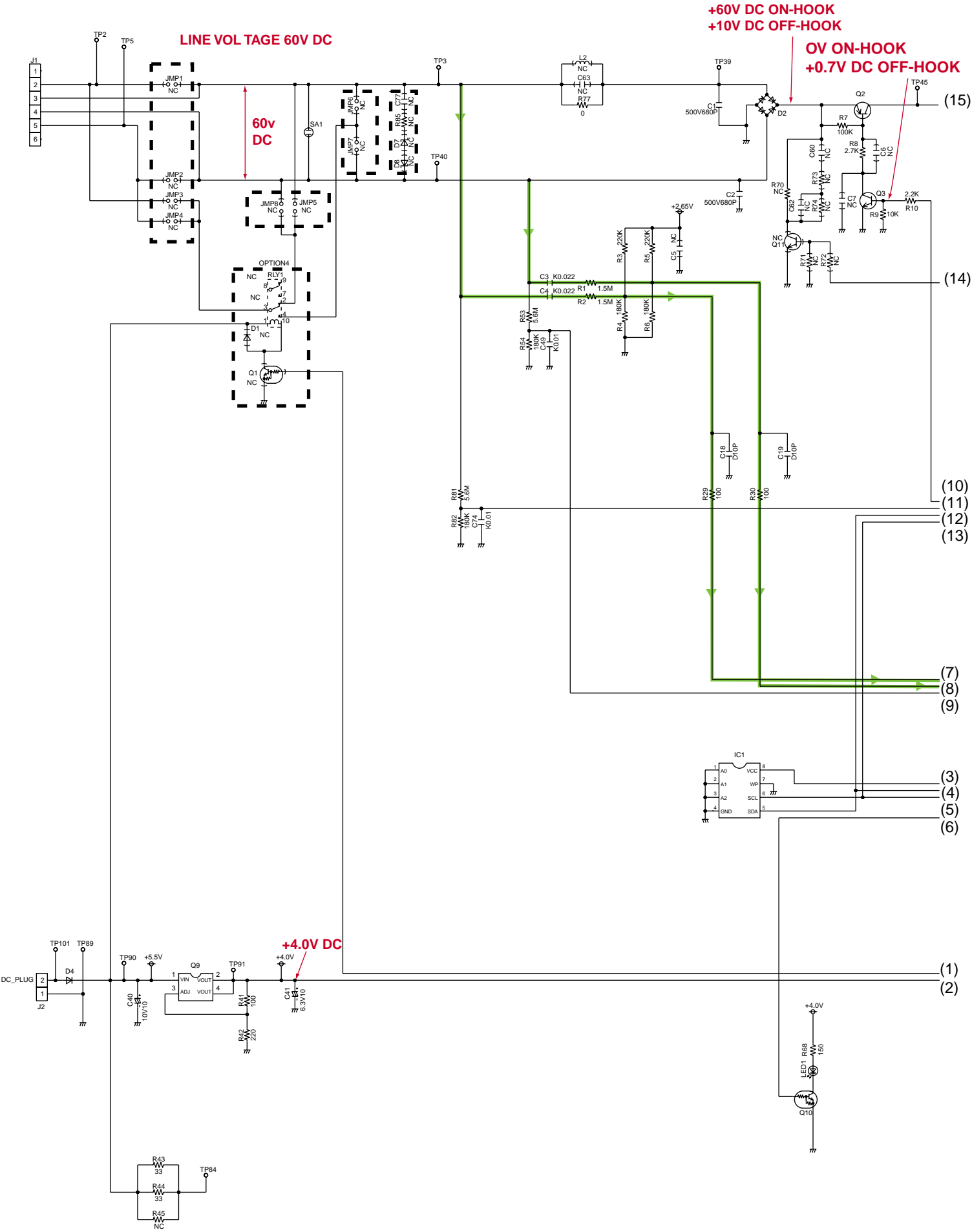


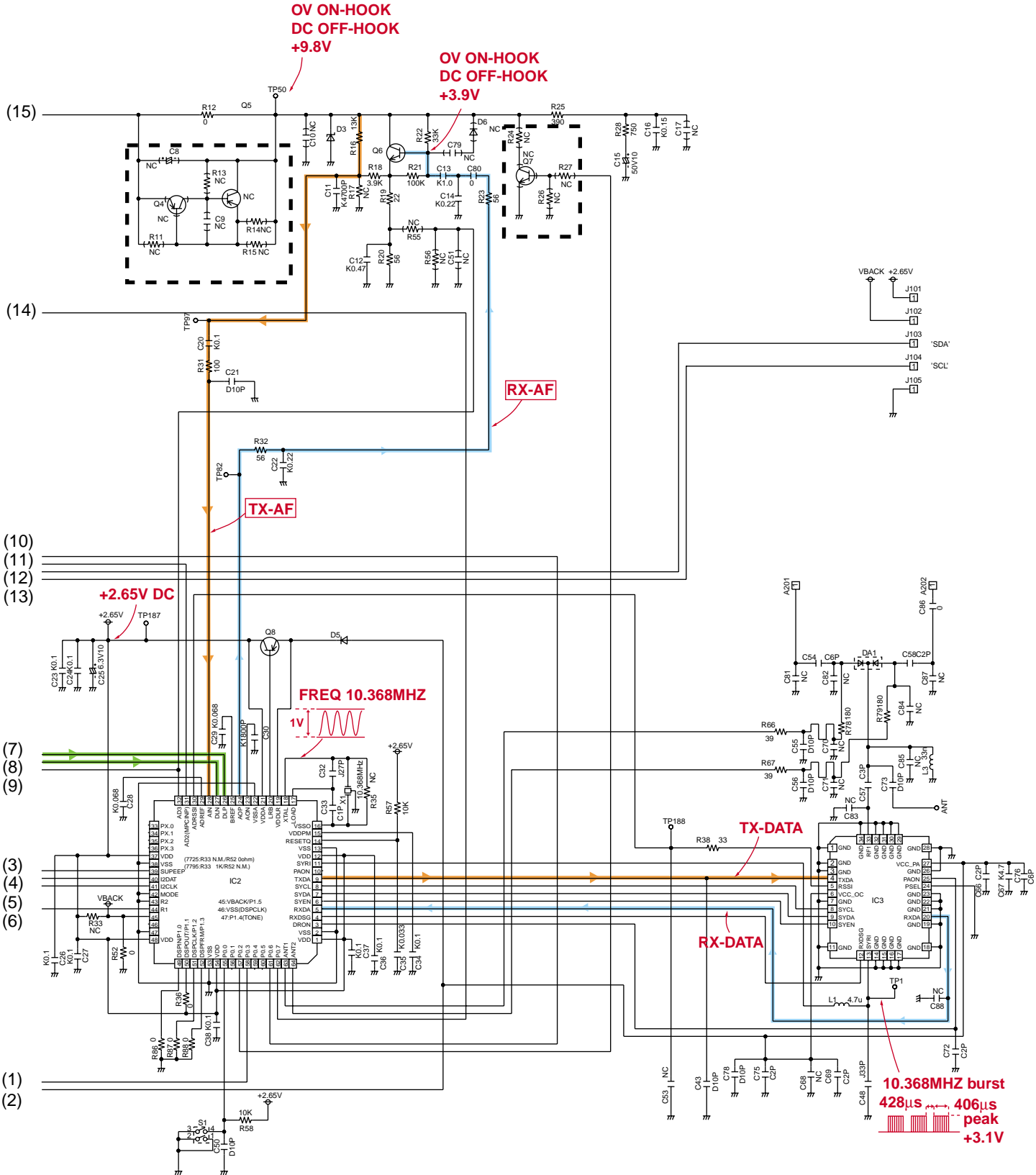


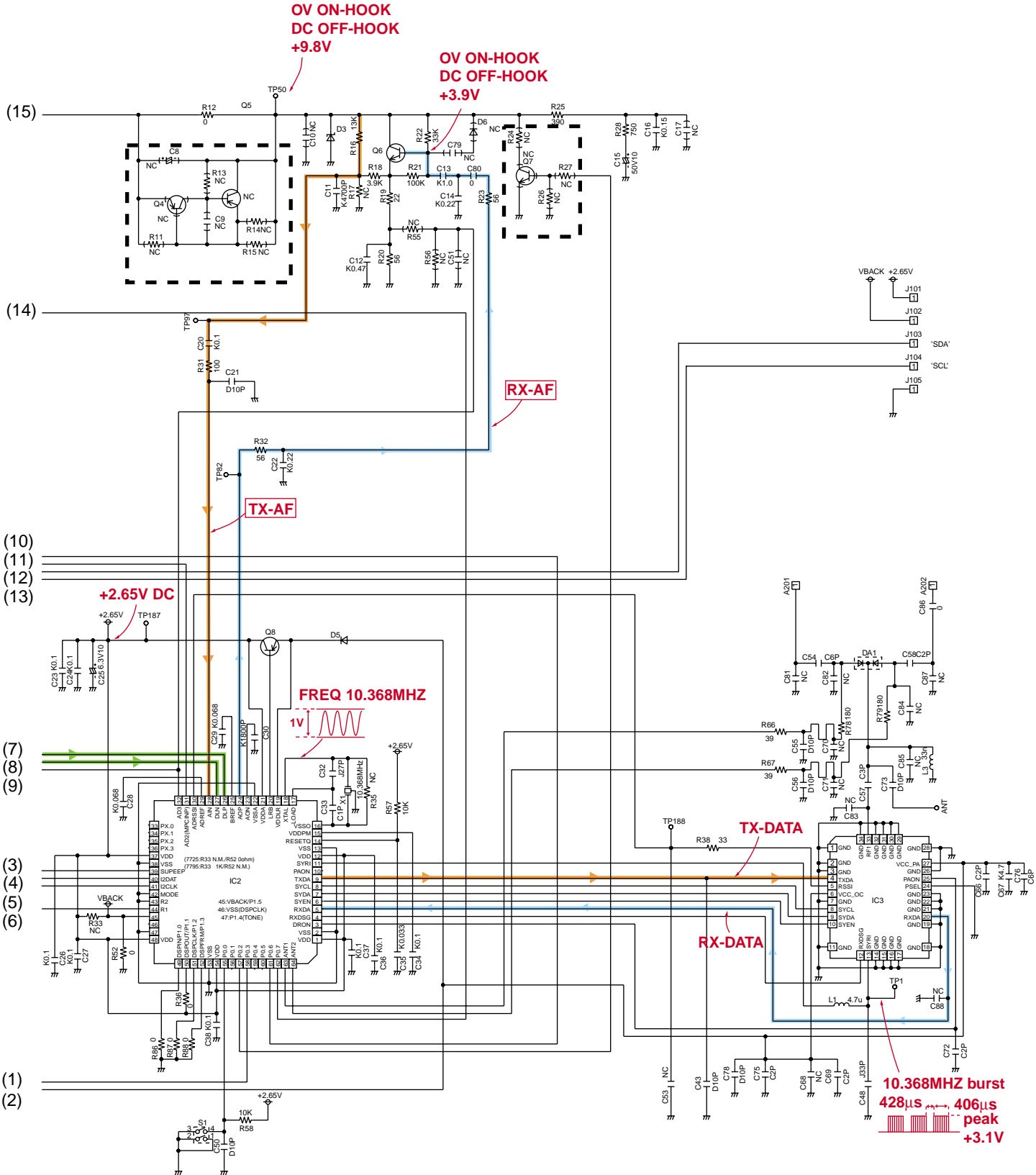


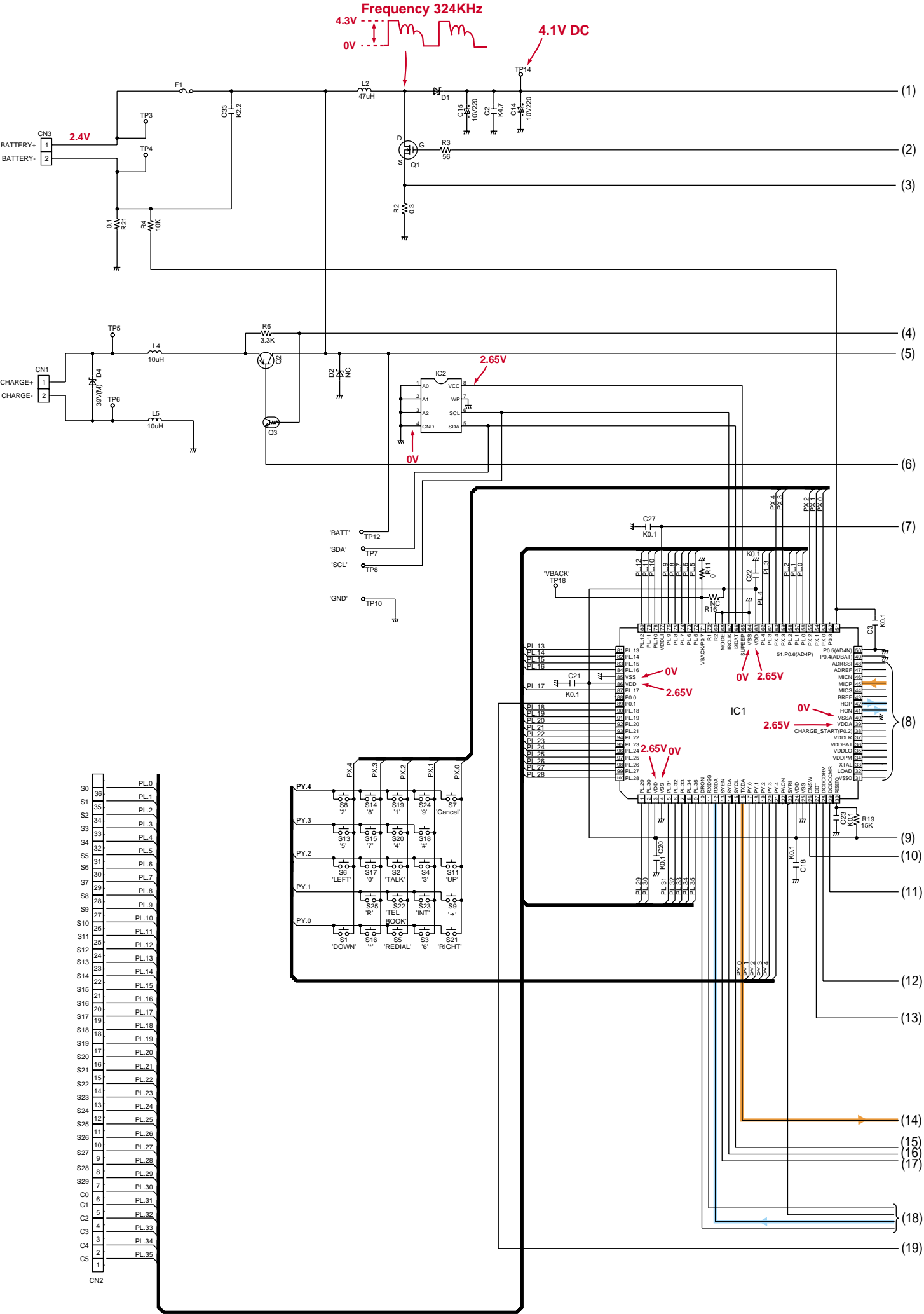


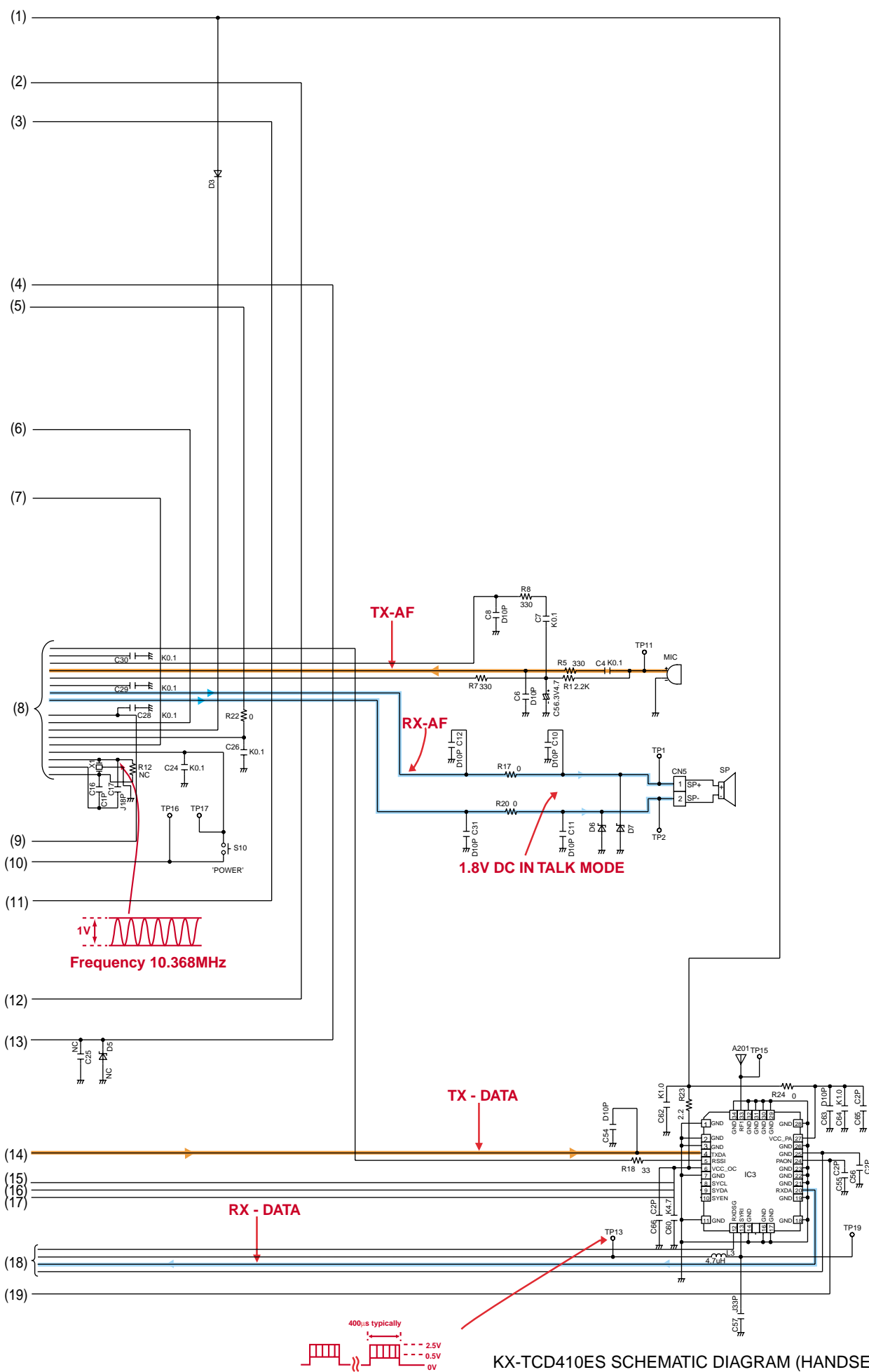
KX-TCD410ES BLOCK DIAGRAM (HANDSET)



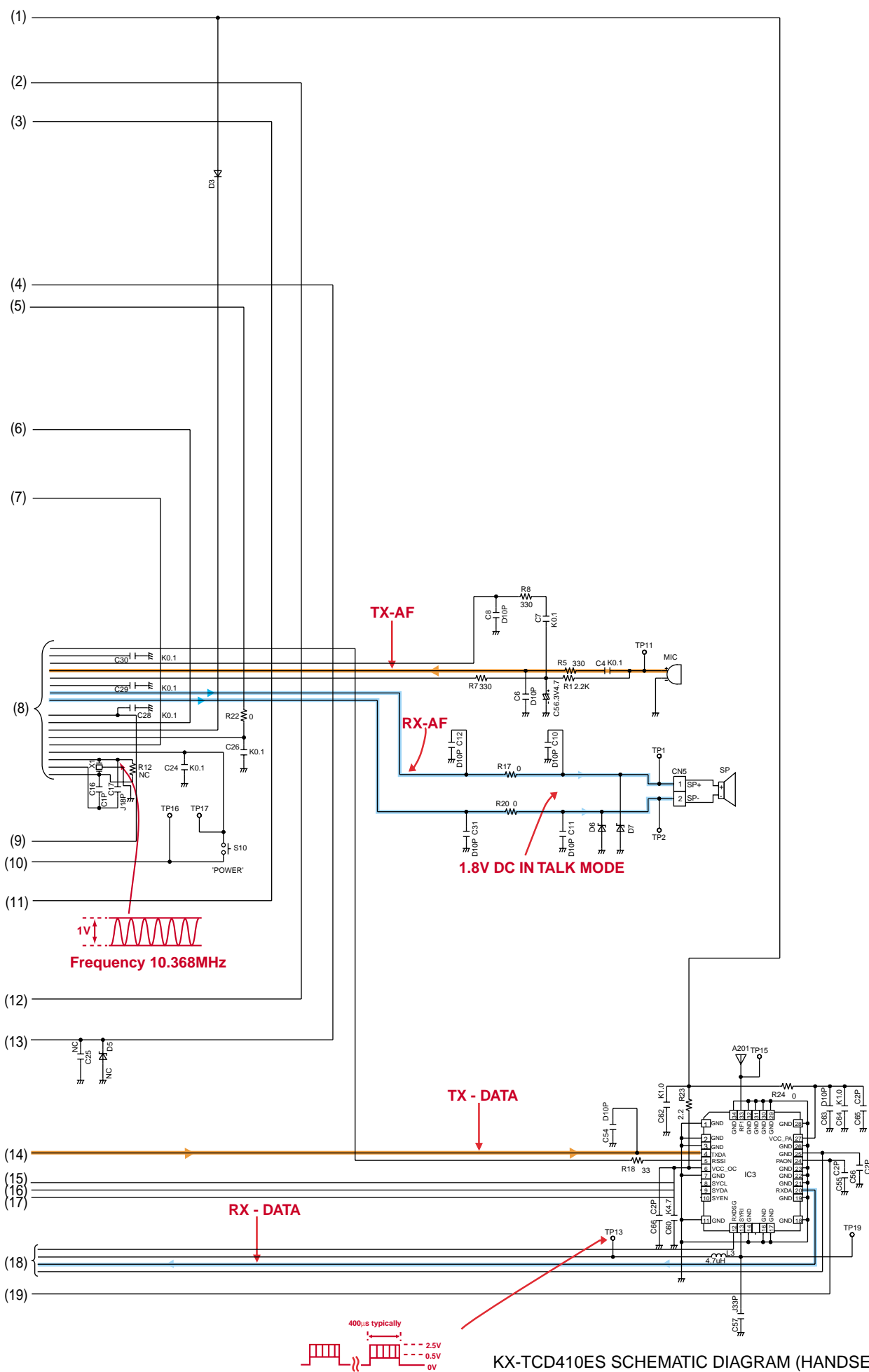




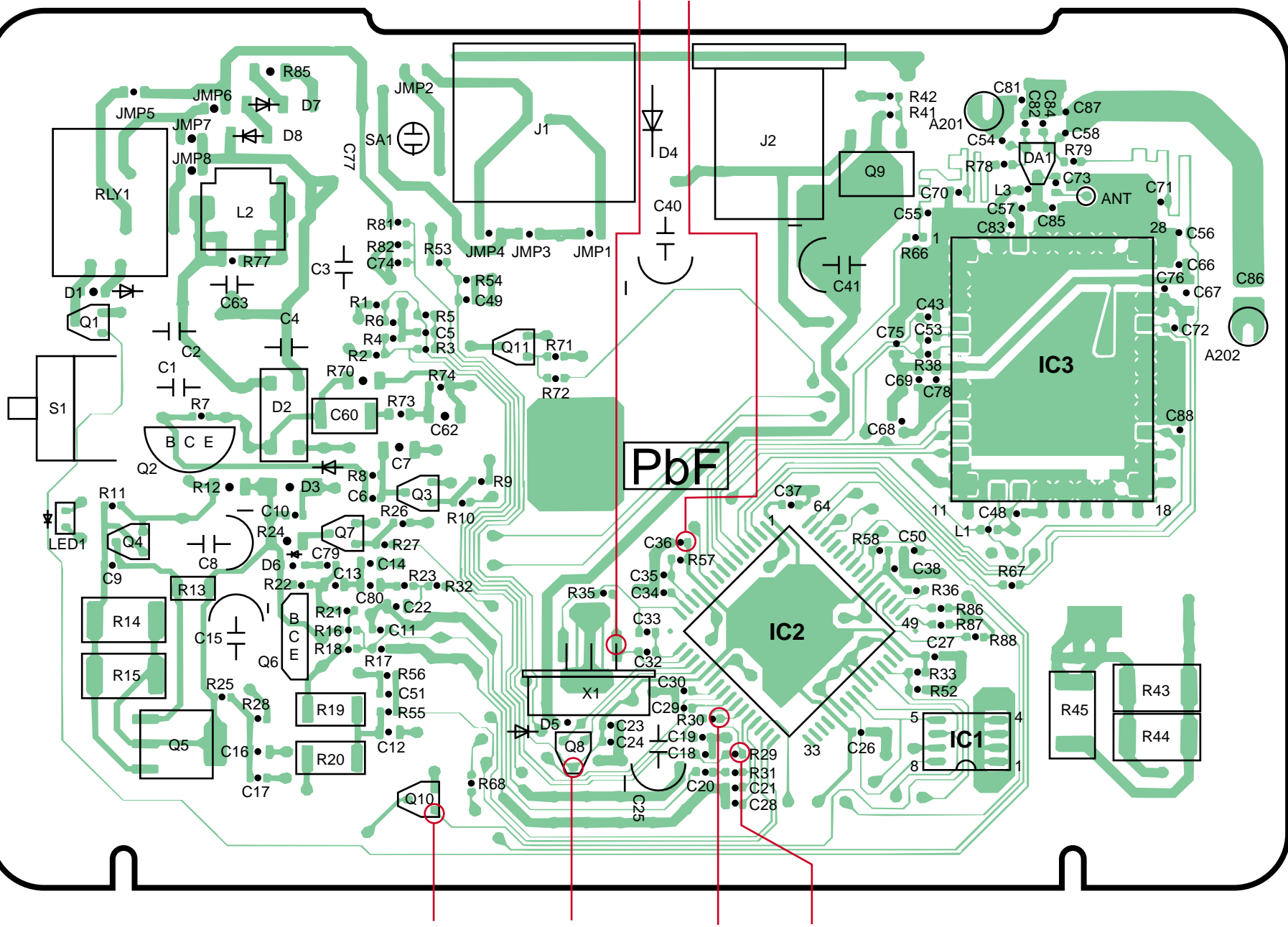




KX-TC410ES SCHEMATIC DIAGRAM (HANDSET)



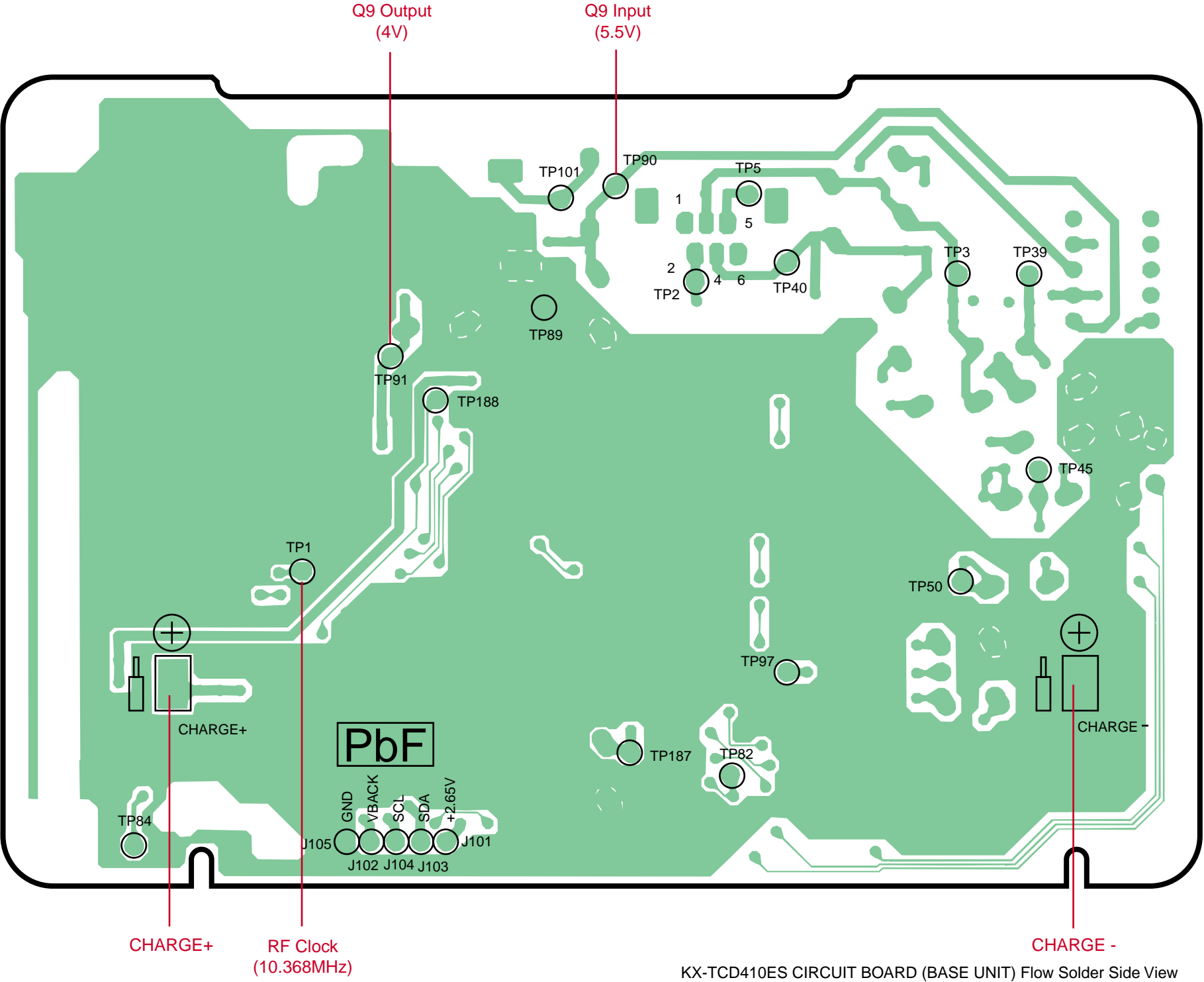
X1
(BBIC: 44
10.368 MHz)
RESET
(BBIC: 14)



Bell LED
(BBIC: 44)

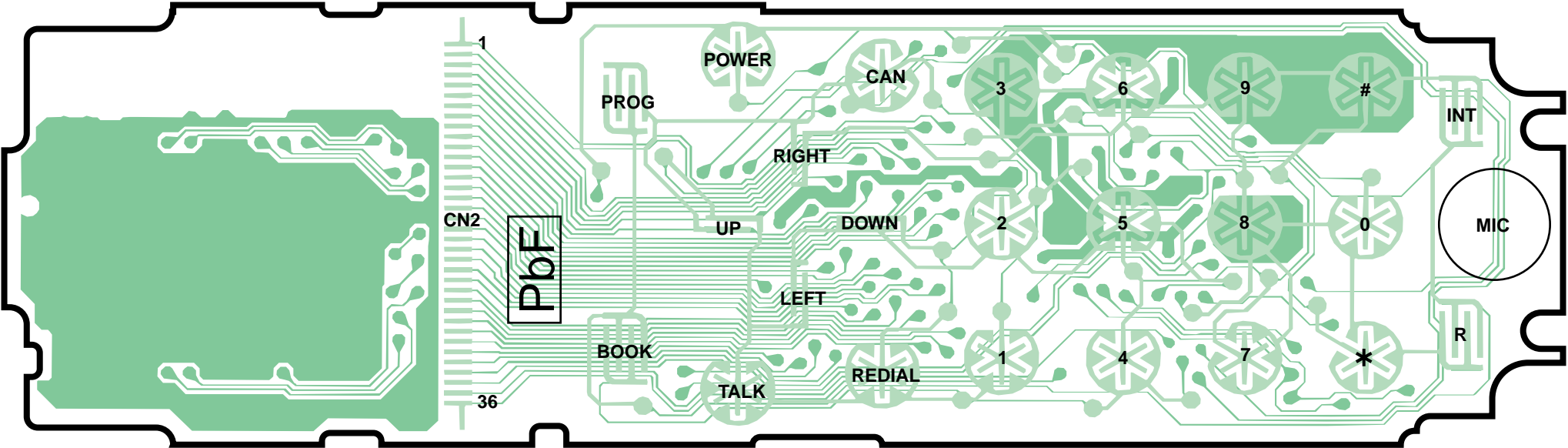
Q8 Collector
(2.65V)

Bell
(BBIC: 27) (BBIC: 26)



KX-TCD410ES CIRCUIT BOARD (BASE UNIT) Flow Solder Side View





KX-TC410ES CIRCUIT BOARD (HANDSET) Flow Solder Side View

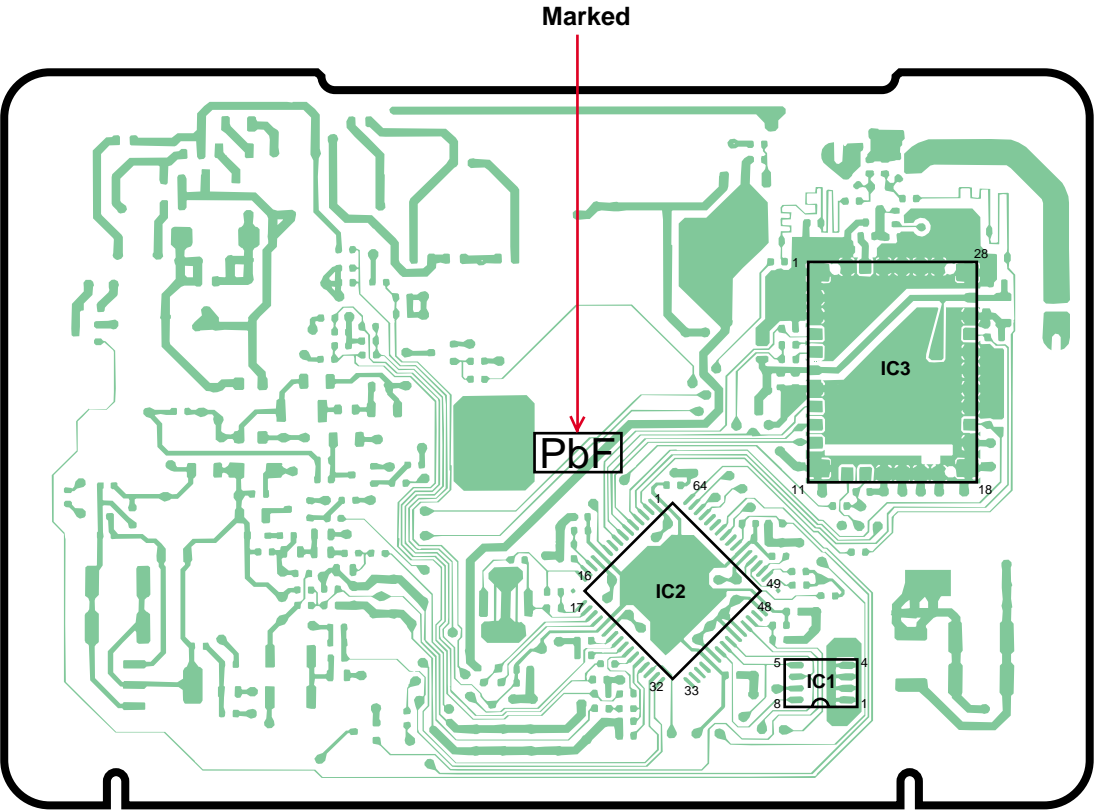
Marked

PbF

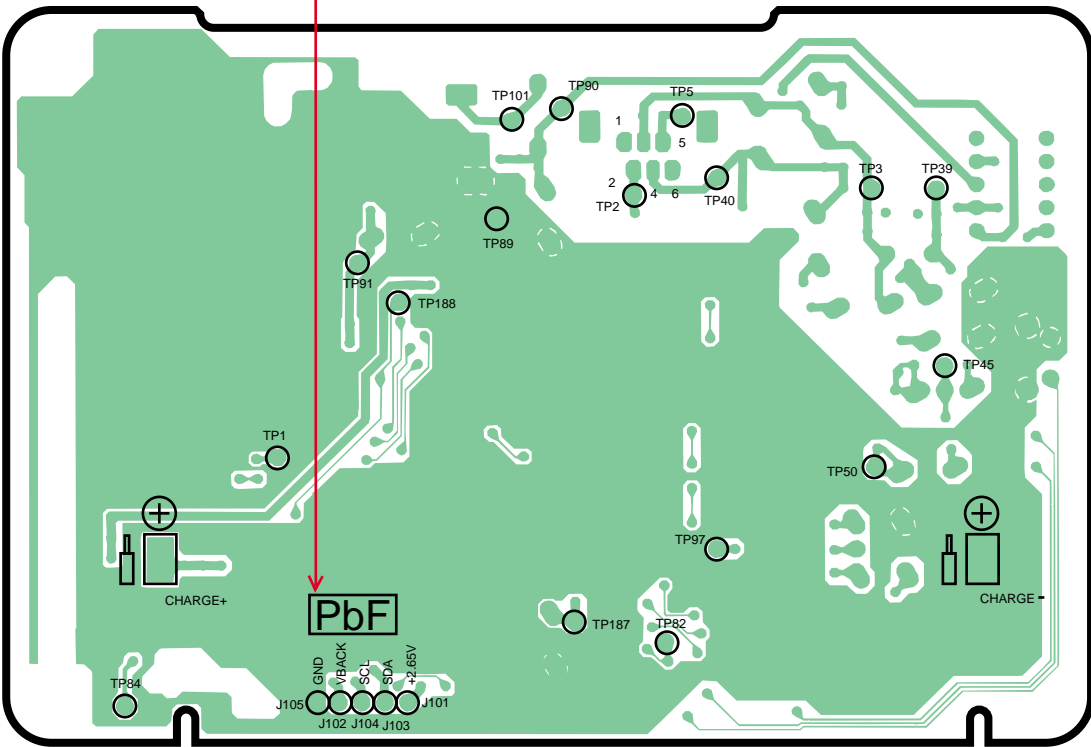
IC2

IC3

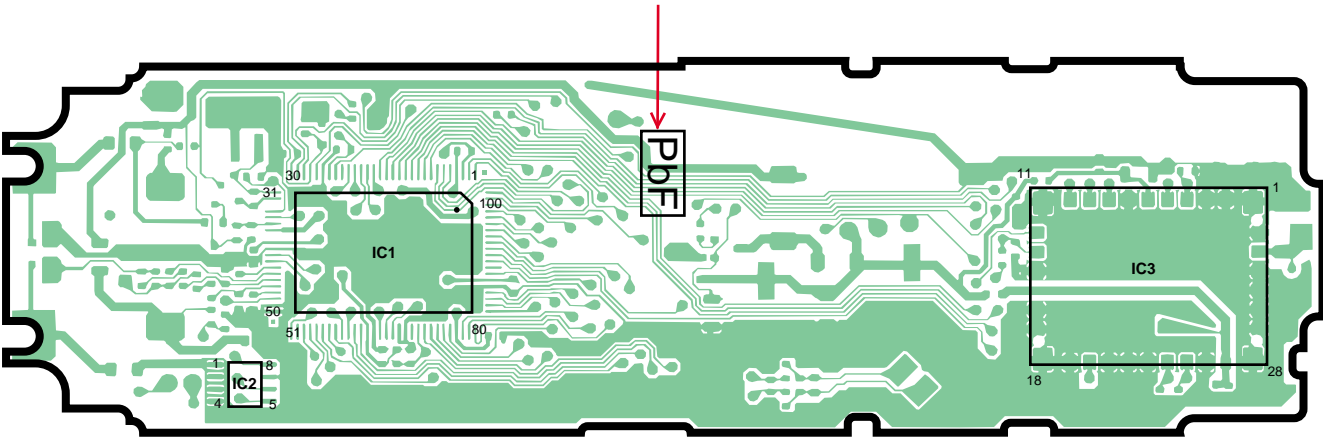
IC1



Marked



Marked



Marked

